PHOTOS: NIAGARA FALLS' BIRD PARADISE

MAPPING
VANCOUVER
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ICE GRIZZLIES

FINDING BALANCE
ON **YUKON'S**
KLUKSHU
RIVER

EPIC AURORA
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TRUSTING
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A 30-YEAR QUEST
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DANCING THROUGH A PRAIRIE WINTER,
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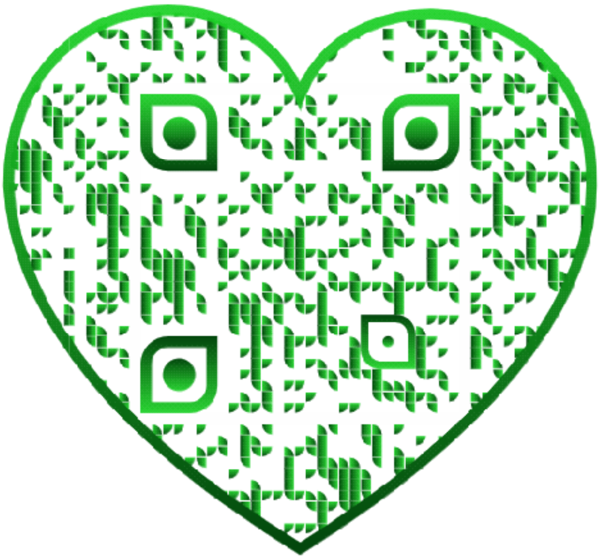

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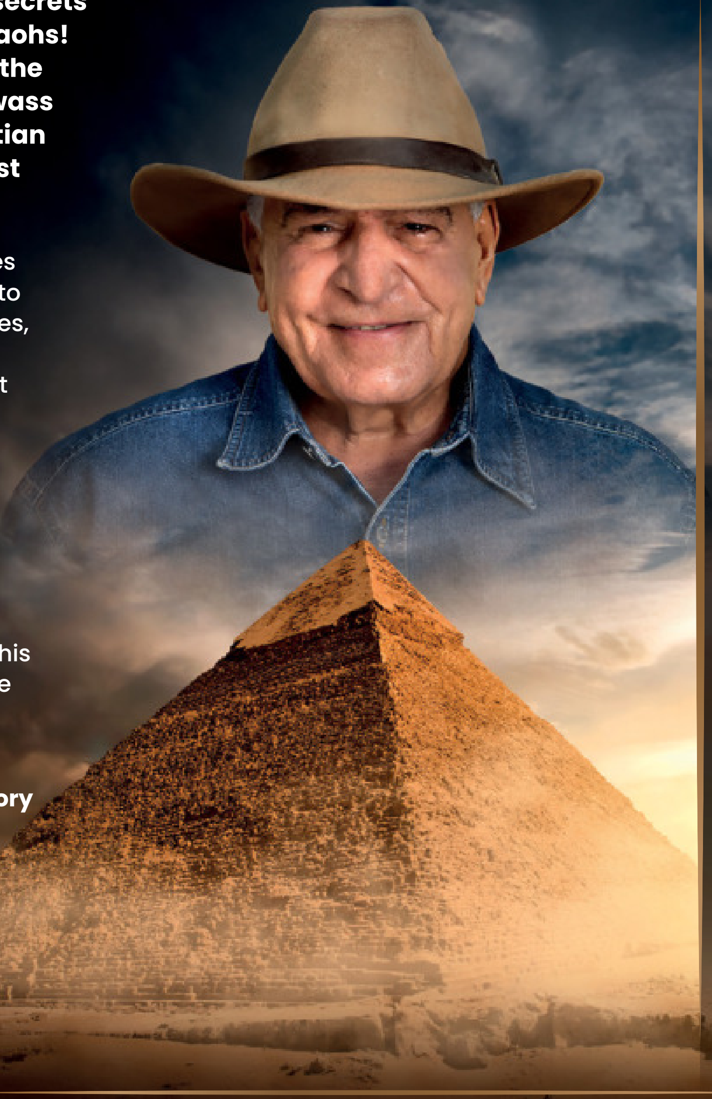

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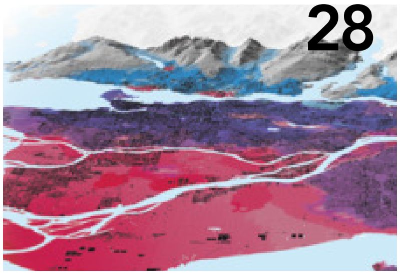

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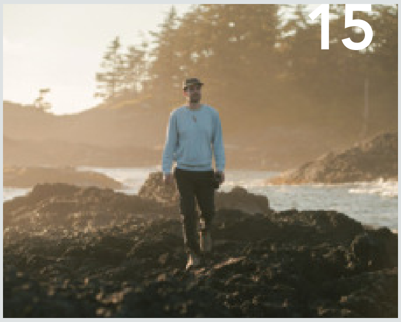

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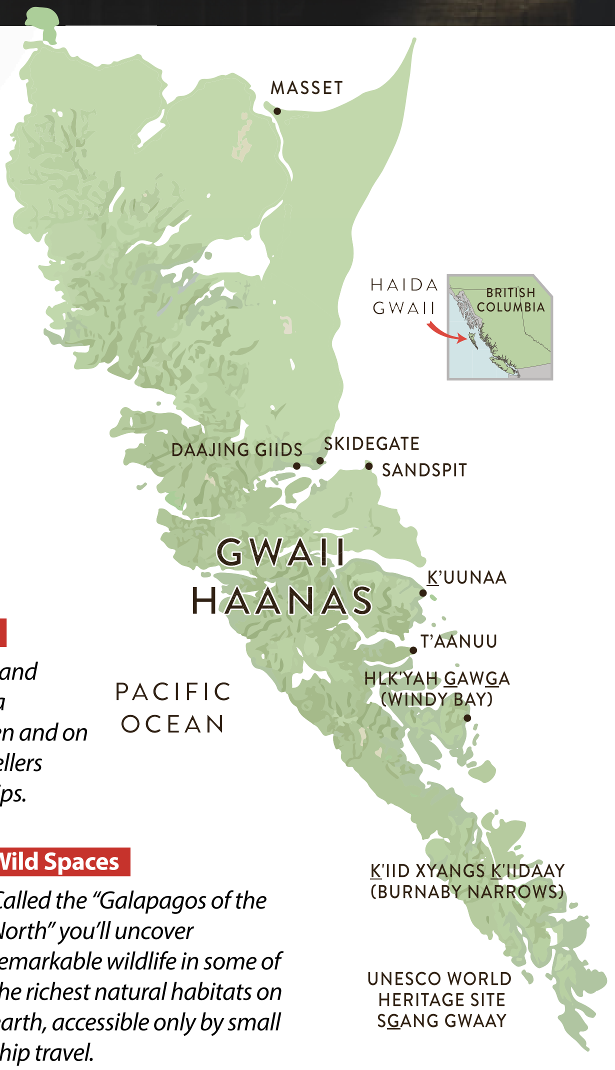
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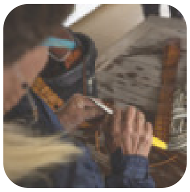

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DIGITAL CONTENTS

DISCOVER

HEALING WINGS

Ecologist Melissa Hafting's birdwatching journey started in childhood with a black-capped chickadee. Many birds later, birding is still bringing joy to her life — and helped ground and heal her while processing grief. Now she's mentoring the next generation of birdwatchers to help young people tap into this healing hobby.

Learn more at
cangeo.ca/melissahafting

COVER STORY

Canadian Geographic
ICE GRIZZLIES

59%

Canadian Geographic
ICE GRIZZLIES

41%

Powerful apex predators, grizzlies are always an attention-getter on the cover of the magazine. Photographer Peter Mather's two shots of the bears coated in ice after fishing for salmon in southwestern Yukon were a difficult choice for readers, as they took to the @cangeo Instagram account to cast their votes. In the end, it was the lighter grizzly on the snow that came out on top, nabbing 59 per cent of the vote.

CORRECTION (SEPT/OCT 2024)

In "Politics of Wild" (September/October 2024), we missed the photo credit for the portrait of Îyârhe Nakoda knowledge keeper Corleigh Powderface. The image was taken by aAron Munson / Big Cedar Films.

PHOTOGRAPHY CLIMATE NEWS TRAVEL WILDLIFE CULTURE

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GOAT goats

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CAN Geo
HERE & THERE

CHASING AURORAS

The year 2024 was a spectacular one to spot the aurora borealis dancing across the sky — just see the photos on page 66. In the 10th episode of Here & There, producer Lia Granger chases the northern lights across Alberta — and explores how some amateur night sky watchers brought to light a phenomenon that scientists didn't know existed. **cangeo.ca/chasingauroras**

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CLOCKWISE FROM OPPOSITE TOP: MELISSA HAFTING; ROBIN ESROCK. COVERS: PETER MATHER

PETER MATHER

CANADA'S STORY

WE COULD HAVE called this the photography issue.

Four very different features, united by a common attribute: incredible imagery. Niagara Falls might just be the most photographed place in Canada — after the Rockies of Banff, of course — yet on page 30, Ryan Tidman delivers a fresh and magical perspective on this natural wonder. On page 38, Sara Hylton's luminous images on medium-format film reveal a community struggling to heal its relationship with water after three decades under a boil water advisory. Peter Mather has spent years documenting coexistence between grizzly bears, salmon and humans on Yukon's Klukshu River (ABOVE); we're proud to share that outstanding portfolio on page 52. And on page 66, we celebrate the aurora borealis of the solar maximum, which over the past year has united Canadians from coast to coast to coast under shimmering skies.

It's the start of a new publishing year at *Canadian Geographic* and I'm excited about the stories we're going to bring you in 2025. Yet I'm also apprehensive. I won't sugar-coat it: the publishing industry is rough right now. At times over the past year, we've wondered whether this magazine will survive to its 100th birthday in 2030. I'm heartened by the many emails we receive each month from longtime readers looking to track down a favourite article from 20 years ago, or reproduce our journalism and cartography in educational materials. It reminds me that, at the ripe old age of 95, *Canadian Geographic* is still vibrant.

And there is still so much to say about Canada! If you value our work, please consider becoming a monthly donor at donate.rcgs.org and help us tell Canada's story.

—Alexandra Pope

To comment, please email editor@canadiangeographic.ca or visit cangeo.ca.

For inside details on the magazine, follow editor Alexandra Pope on X (@XelaEpop) and Instagram (@xela.explores).

Help us tell
CANADA'S STORY

NEARLY 20 YEARS AGO, I submitted a photo of two polar bears sparring in Churchill, Manitoba to the *Canadian Geographic* Photo Club. That image was picked as the "photo of the week," and propelled my career as a nature photographer.

Today, the Photo Club is the creative home of 15,000 emerging and established wildlife photographers across the country. Help us tell Canada's story by giving what you can to support and grow our community of visual storytellers.

MICHELLE VALBERG
Canadian Geographic
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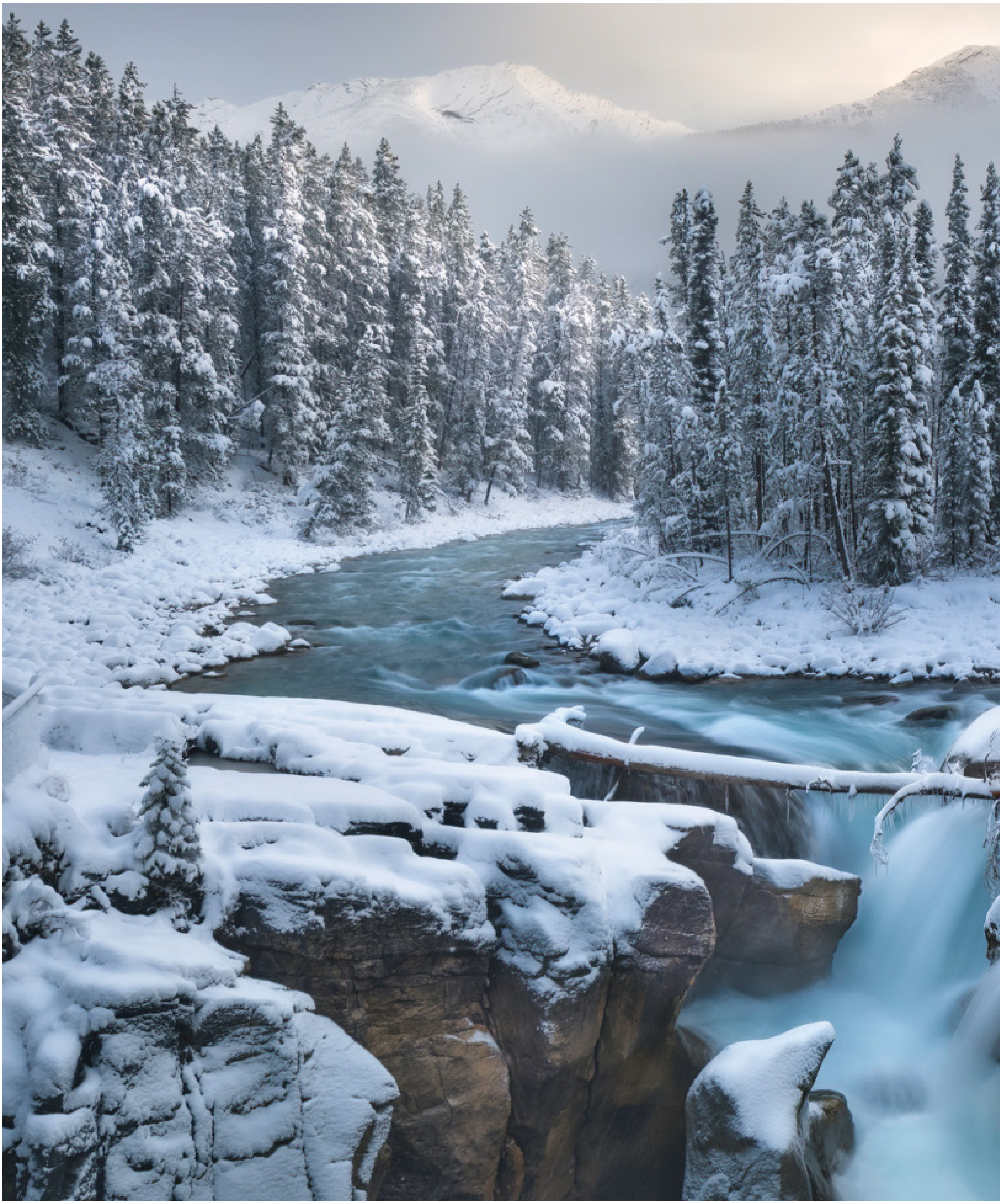
Celebrating Canada's Grandeur



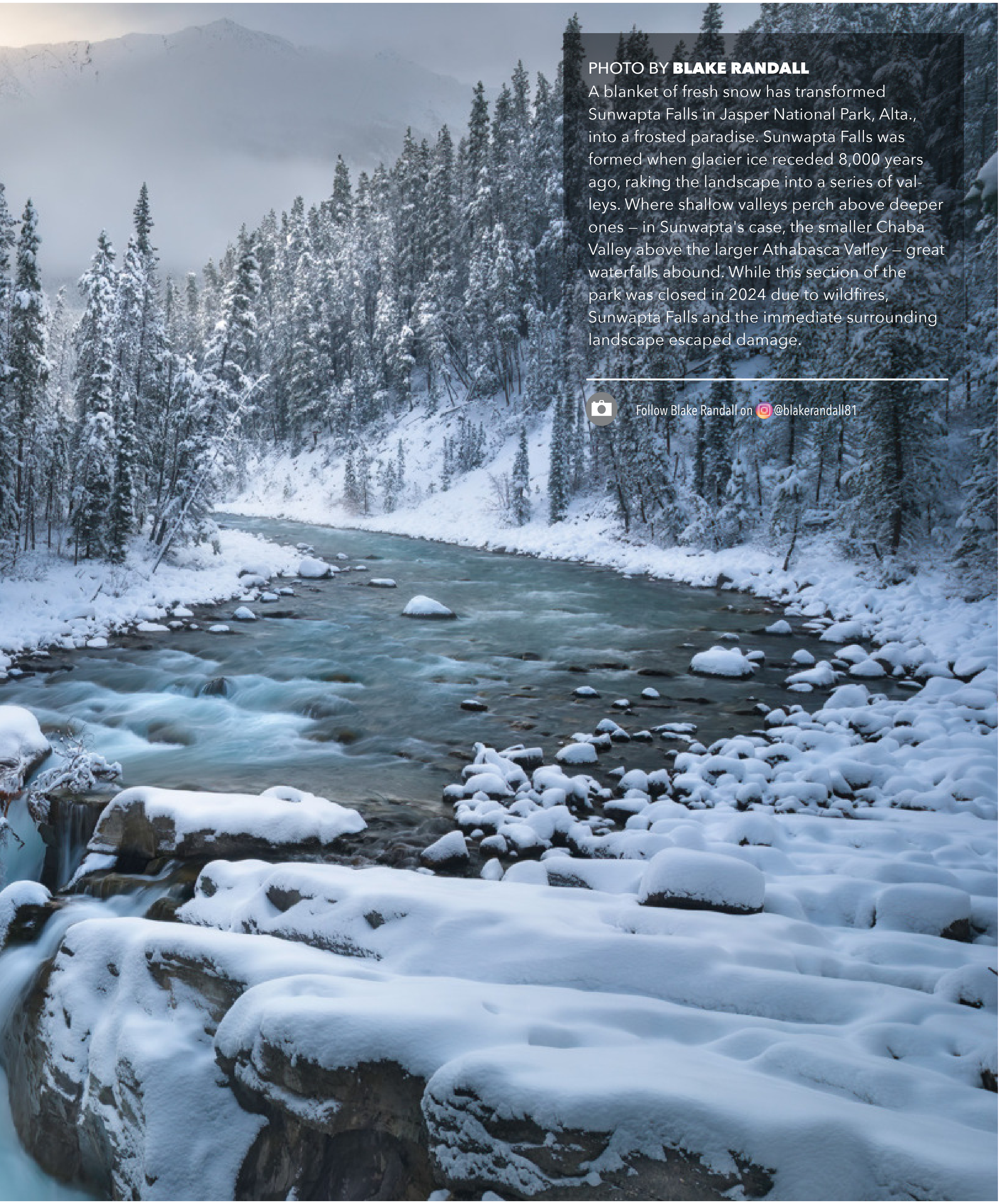


PHOTO BY **BLAKE RANDALL**

A blanket of fresh snow has transformed Sunwapta Falls in Jasper National Park, Alta., into a frosted paradise. Sunwapta Falls was formed when glacier ice receded 8,000 years ago, raking the landscape into a series of valleys. Where shallow valleys perch above deeper ones – in Sunwapta's case, the smaller Chaba Valley above the larger Athabasca Valley – great waterfalls abound. While this section of the park was closed in 2024 due to wildfires, Sunwapta Falls and the immediate surrounding landscape escaped damage.

Follow Blake Randall on @blakerandall81

EXPOSURE

Showcasing our photo community

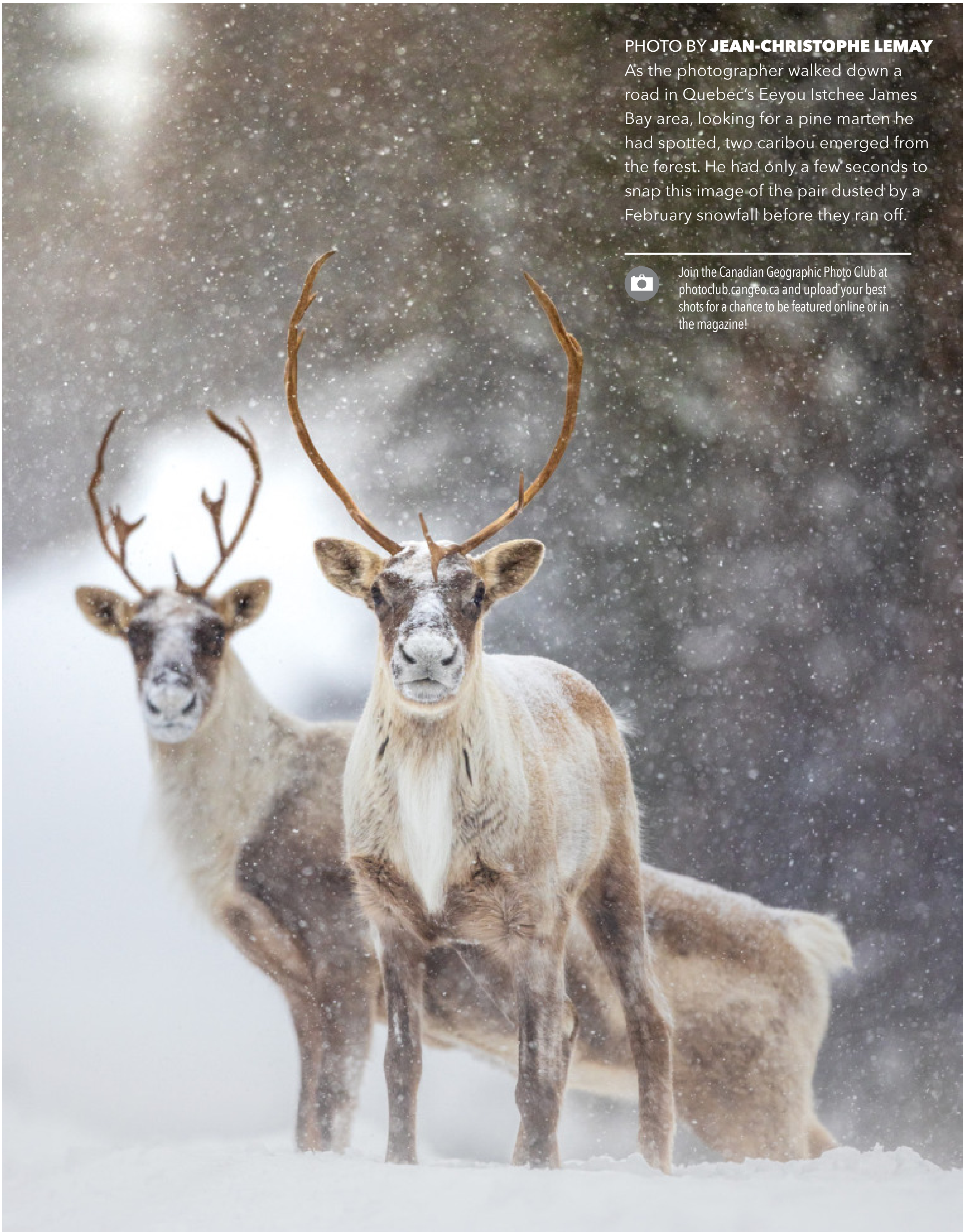


PHOTO BY **JEAN-CHRISTOPHE LEMAY**
As the photographer walked down a road in Quebec's Eeyou Istchee James Bay area, looking for a pine marten he had spotted, two caribou emerged from the forest. He had only a few seconds to snap this image of the pair dusted by a February snowfall before they ran off.

Join the Canadian Geographic Photo Club at photoclub.cangeo.ca and upload your best shots for a chance to be featured online or in the magazine!

IN A SNAP

Sharing Can Geo via Instagram

@hay_picturethis Leanne Hay
View of downtown from Humber Bay Park West, Toronto

@nickparaykoimages Nick Parayko
Great grey owl, Morinville, Alta.

@mixolydian74 Mark Gray
Snowdrifts in Bonavista, N.L.

@creativeislandphoto Peter Baumgarten
Milky Way over Lake Huron, Manitoulin Island, Ont.

@liron_gertsman_photography Liron Gertsman
Dall's sheep, Kluane National Park, Yukon

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Connel Bradwell filming *Animal Pride* in Tofino, B.C.

RYAN WILKES

Connel Bradwell

The biologist, conservationist and filmmaker on his documentary *Animal Pride*, an exploration of queer animal behaviour

INTERVIEW BY **ABI HAYWARD**

Wildlife filmmaker and conservationist Connel Bradwell was researching orcas when he saw something he did not expect: two male orcas engaging in courtship behaviour. And no, they weren't roommates. As a queer biologist, Bradwell started to ask questions: "How come I didn't know that much about homosexuality and queerness in the natural world? Why haven't we been talking about this? Why didn't I learn this at university?" In search of answers, Bradwell brought the concept to production company Handful of Films and assembled a creative team that included director Rio Mitchell and writer Erinn Drage. The result? *Animal Pride* (premiering January 9 during the 64th season of CBC's *The Nature of Things*), a nature documentary that shines a dazzling light on the natural world — and our place in it.

On queerness in nature and biodiversity

Queerness is found extensively throughout the natural world. It's seen at every trophic level. When we were going through what species we could cover, at the beginning we were like "gosh, are there going to be enough examples?" And by the end you're like, "oh, *everything* is an example!" It's the rule, not the exception. I think what was so amazing and interesting

Read an unabridged version of this interview at cangeo.ca/animalpride

RYAN WILKES

Jaylen Bastos – a.k.a. Batty Banks – incorporates nature into their drag performance. Bradwell speaks with Bastos as part of the documentary.

is that queerness is expressed in such unique and different ways in different species. There is no one queer behaviour. What queerness looks like for an albatross is different for a human is different for a banana slug. But it can still go under the umbrella of queerness. When we think about queer nature being biodiversity, what we're saying is that you can't have biodiversity without queer nature.

On sexual expression in fungi

Fungi really blew my mind because this is an organism that has thousands of sexual expressions. It totally blows up this idea that there are just two sexes in nature. Fungi show that there are thousands of different variations of sexual expression. They send out their spores, and within each of those spores there's a different genetic makeup for a different sexual expression. And when they bump into one another, they can transfer their DNA and essentially "mate." Sexual diversity is key to their survival.

On challenging scientific biases

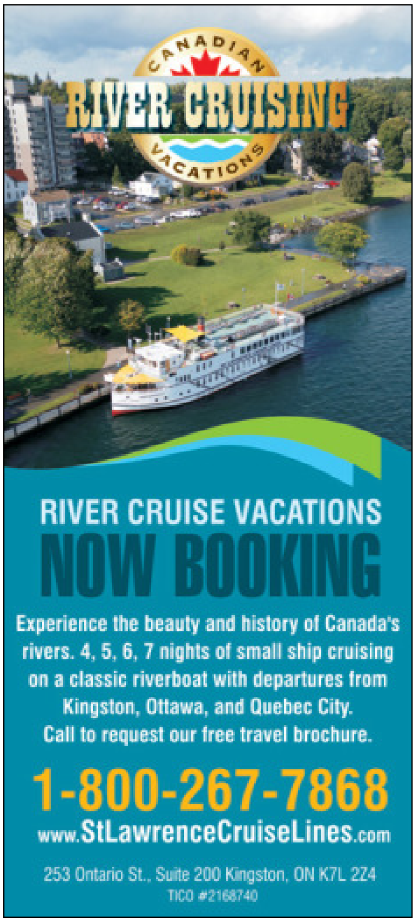
We have a heteronormative bias. We see either what we want to see or what we're used to seeing. So often we make assumptions about animals — such as assuming that all the pairs we might see are heterosexual pairs, but without ever really checking that. Or, historically, where we've seen same sex behaviour, it's been hidden: that's bringing biases from someone's opinion and putting it onto the natural world. So we challenge that and ask: Why do we put these biases on the natural world? Why has it been *hidden* and what is the impact of that? Because it does have a big impact, not just on us and on the animals, but on the wider way that we conserve nature.

On how understanding queerness in nature can help protect it

It's not just a story about queerness and how natural it is, but one of how much we need to understand these animals and see them for what they *really are*, not just what we perceive them to be. Because that's the only way we will be able to adequately protect them. You have to be able to create protections that allow penguins to be penguins. Or animals like orcas, albatross, slugs. Multiple species have these societies and behaviours that are really important to the function of their populations. If we don't know about it or are actively ignoring it or hiding it, then we're missing a part of the puzzle. We'll never be able to properly protect them if we're not taking into account [their behaviours] and setting up a place where they can be what they actually are.

On celebrating queer joy

We didn't take calling the documentary *Animal Pride* lightly. Pride is a celebration, and pride is a protest. Pride is about our rights and our freedoms and the right to be who we are. But pride is all those serious things packaged in fun and creativity and joy, so we wanted to reflect that in the documentary. We wanted to tell this story about serious topics in a way that also celebrated the queer community, celebrated queerness in nature and was like a pride event. We really worked hard to make it fun. And having a queer team meant we all had a personal connection to this story. We all understood what pride is about, and that's reflected in how we told the story. ❁



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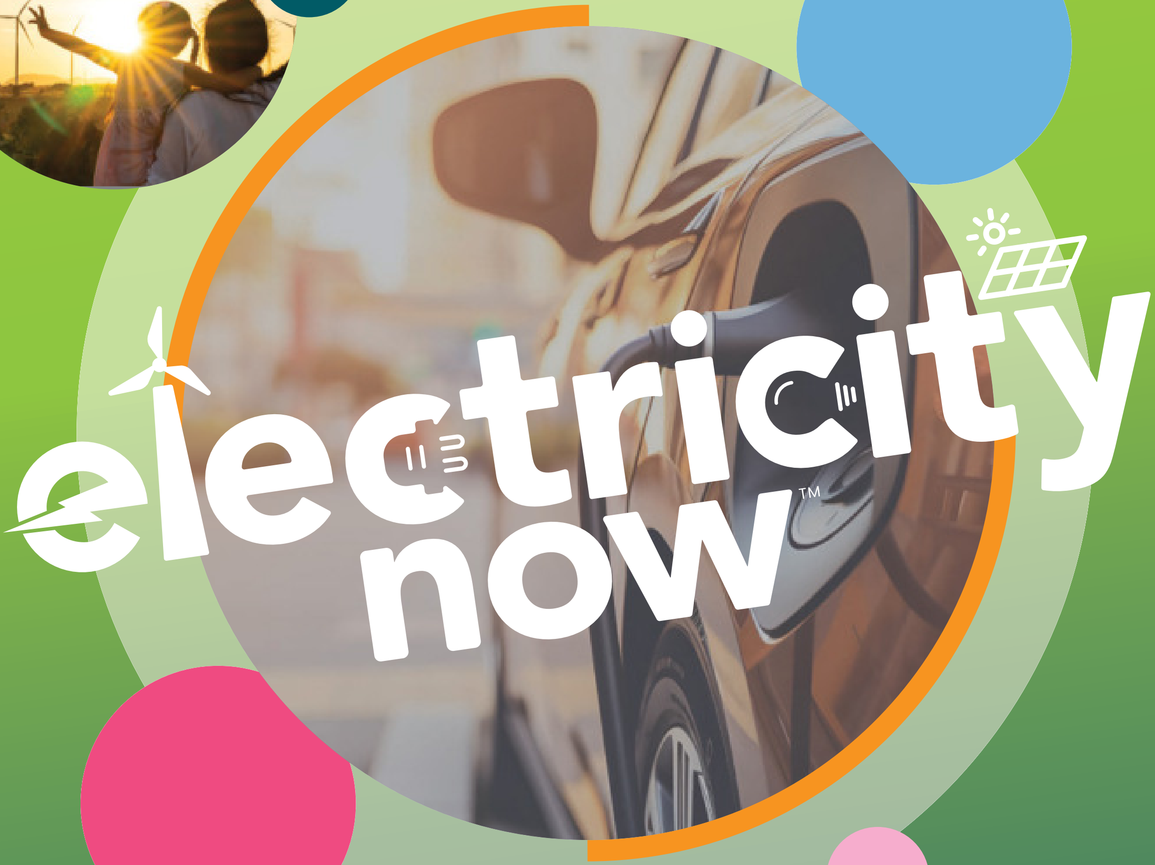

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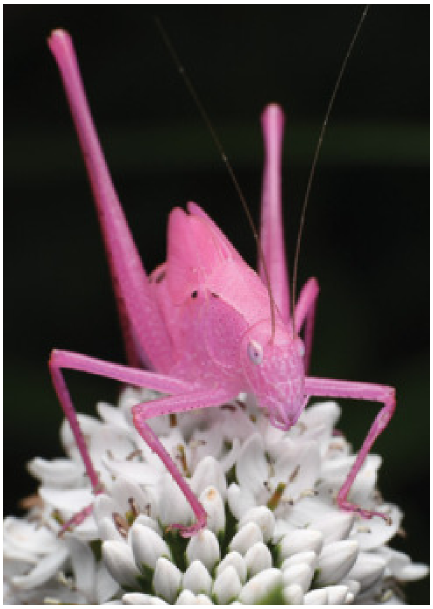
THAT'S HOW MUCH the Atlantic puffin shrank between 1995 and 2022, according to researchers from the University of New Brunswick. Their study, which focused on the province's Machias Seal Island population, found that although their overall size has decreased, the puffins' beaks have become proportionally larger. Researchers hypothesized these changes may help the seabirds dispel heat more effectively as their habitat warms. They also found puffins had shifted their hatching periods and have less steady access to herring than in the past as a result of climate change.

Arctic adaptation

MANY OF THE TRAITS that make polar bears so well adapted for Arctic life are the same genetic differences that separate them from their closest relative: brown bears. Now, new genomic analysis of modern polar and grizzly bears and fossilized polar bears by University of Copenhagen scientists suggests polar bears may have adapted to the Arctic as recently as 70,000 years ago. Compared with other Arctic mammals such as harp seals, which have been in the Arctic for about two million years, this is truly a blip on the evolutionary timescale.



Pink mutation, life is your creation

BARBIE-PINK KATYDIDS have been found strutting their flamboyant colouring in Ojibway Park in Windsor, Ont. The rosy pigment is caused by a recessive gene found in one in 500 katydids, a usually green grasshopper-like insect. This mutation leads to "erythrism," a condition similar to albinism that produces reddish pigmentation of skin, scales or feathers. According to wildlife photographer Geoff Pekor, who seeks out the insect in Ojibway Park, the pink katydid is typically seen out in the open only at night.

Read *Canadian Geographic*'s latest wildlife stories at cangeo.ca/wildlife.

Ex mycelia

MUSHROOM ROBOTS, or mycelia-machine hybrids, sound like the stuff of science fiction. But scientists at Cornell University have now produced two of these hybrids — one walking, the other on wheels — by combining tissue from the root-like structures of king oyster mushrooms with robotics. Fungi produce bioelectrical signals, and their natural aversion to light can be electronically translated into information to move the robot parts. Researchers hope these hybrids could produce more environmentally-sensitive robots.

Life's a peach

FROM 1990 TO 2023, sightings of invasive peach blossom jellyfish, native to China, were recorded in 34 places in British Columbia — from Vancouver Island to as far inland as Osoyoos Lake. A first-of-its-kind study on peach blossom jellyfish in Canada by University of British Columbia researchers posits the species will likely expand its range in the province as waterways warm due to climate change, predicting another 80 sightings in this decade alone. Of the jellyfish examined so far, all were genetically identical males, or clones.

OPPOSITE PAGE: SHAUN ANTLE/CAN GEO PHOTO CLUB
THIS PAGE, CLOCKWISE FROM TOP: ANTHONY AMSEL/CAN GEO PHOTO CLUB; HATCAT PHOTOGRAPHY/PXFUEL; IMAGO/ALAMY STOCK PHOTO; GEOFF PEKOR

A stitch in time

How Black matriarchs in Nova Scotia stitched quilting into the fabric of art history

BY **FELESHIA CHANDLER**

AS A CHILD GROWING UP in East Preston, N.S., Melinda Clayton Patterson watched her mother Lilian hand-sew quilt after quilt. One stitch at a time, Lilian pieced together squares of old fabric to make a cozy blanket that would keep Clayton Patterson warm on the coldest of days.

"My mother would just cut up old clothing," says Clayton Patterson. "It wasn't about making a quilt to represent this, that or the other. It was about making a quilt for warmth."

Little did Clayton Patterson realize her mother — along with dozens of other Black Nova Scotian matriarchs — was making history and telling stories through a utilitarian practice dating back hundreds of years. Someday soon, Clayton Patterson would be making history too.

"It wasn't considered an art form until recently, so essentially quilts were just part of the fabric of what people did, what the women did," says David Woods, a self-taught multidisciplinary artist and founder of the Black Artists Network of Nova Scotia.

In the late '90s, Woods was co-curating an exhibit of works from Black Nova Scotian artists called *In This Place* when a friend, Alfreda Smith, asked whether he'd thought to include quilts. "Once I [started] looking at quilts, I realized that was actually the main tradition in the community," says Woods. "Almost every community had quilters."

As Woods made his way from community to community, visiting Black neighbourhoods across the province, he realized not only were there many Black quilters — but depending on where he went, many had their own unique styles and patterns. For example, "East Preston was literally all strip quilts," says Woods.

Strip quilts use strips of fabric to make up the entire quilt, a process with roots in West Africa, according to Woods. Other communities used more complicated patterns. "You got to some places like Weymouth and Digby, where the patterns were very sophisticatedly done," Woods says.

In 1998, as the first collective Black art exhibit in Nova Scotia, *In This Place* shone a spotlight on more than 40 local artists — and introduced Nova Scotia to quilts from Black communities as art. "It led to other things, including the creation of a new quilt guild, the Vale Quilters, and an ongoing relationship with quilts," says Woods.

Myla Borden, one of the featured quilters, started the Vale Quilters Association in 2007. The association has been involved in numerous art exhibits.

As he spoke with more quilters, Woods discovered quilting was also a means to continue oral history. He realized some quilters were reproducing "Underground Railroad" patterns said to contain secret codes. In 1999, the book *Hidden in Plain View* suggested Black people seeking asylum from slavery used quilts with specific patterns to navigate escape on the Underground Railroad. For example, the log cabin pattern depicted a square surrounded by rectangles and meant escapees had found a safe house.

These patterns resonated with many people in the Black community across the globe, including Melinda Clayton Patterson and Heather Cromwell, who regularly use the patterns. "I myself was intrigued by it," Clayton Patterson says. "I started getting more and more involved with it, and it just took over my heart."

Also inspired by the Underground Railroad patterns, Cromwell, of the Vale Quilters Association, created a multigenerational quilt with her granddaughter, son and mother called "It Takes Four."

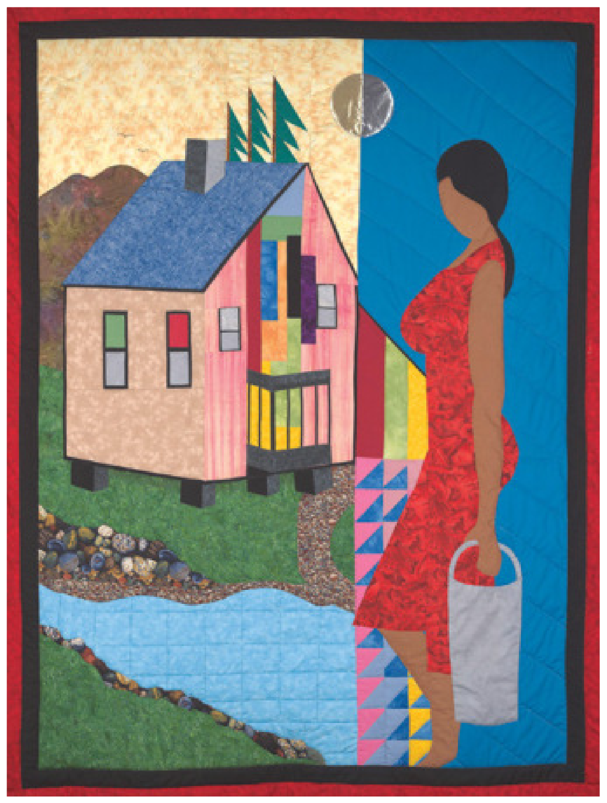
Then, in 2011, the exhibit *The Secret Codes: African Nova Scotian Picture and Narrative Quilts*, curated by Woods, made its debut. It featured African Nova Scotian quilt-making, with quilts from 1930 to 1960, traditional and contemporary patterns, picture quilts designed by Woods and Underground Railroad patterns.

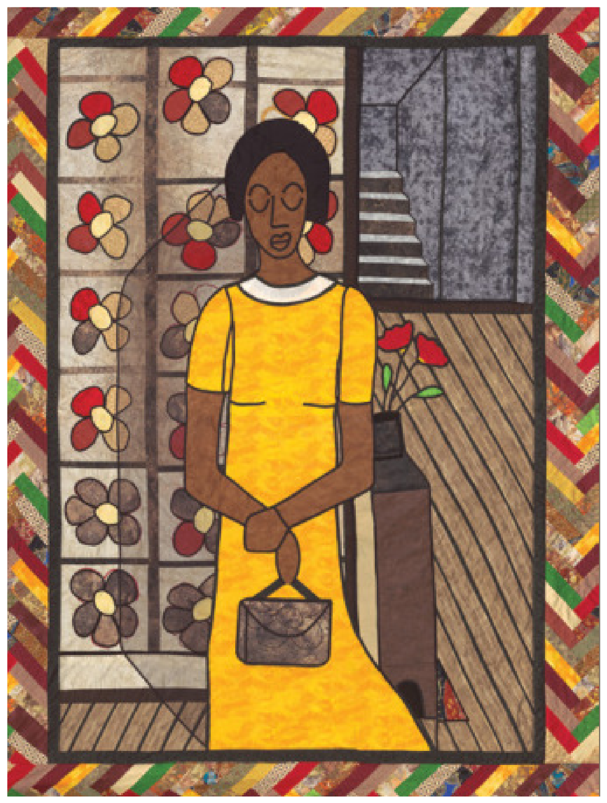
The exhibit has since been adapted and expanded to go on tour nationally. "The work that comes out of the Black community is worth seeing," says Cromwell. "It speaks for itself."

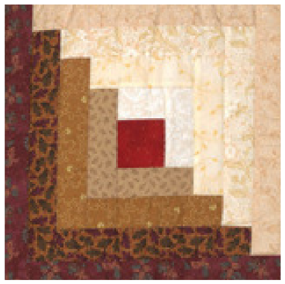
Woods isn't sure whether quilts were used to guide the way of enslaved people, but he does know one thing for certain: it left a mark on the community, changing how people saw age-old patterns. "The patterns had new meaning for folks, new vitality."

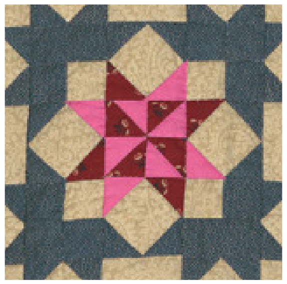
Clayton Patterson says the patterns are still important. "Even though I'm not able to trace it back in my family, it's still part of my history. It's Black history." She has no doubt there are still hundreds of Black quilters in the province, and she wants the legacy to continue.

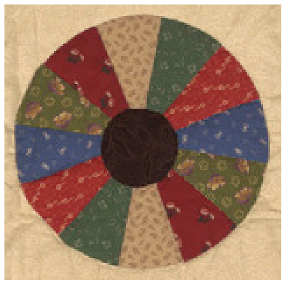
"I just want to share my techniques and theories for as long as I can and share it with as many people as I can… I think it's great to share not only with your own culture but with other cultures," says Clayton Patterson. "We just need to keep doing what we're doing."

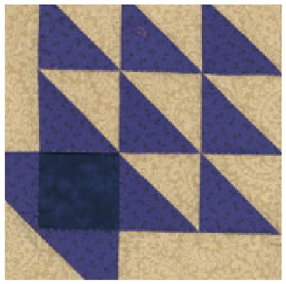


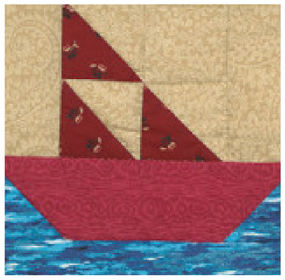


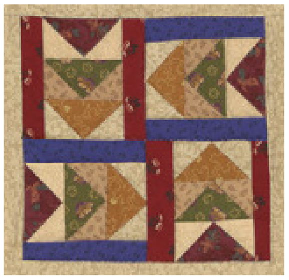


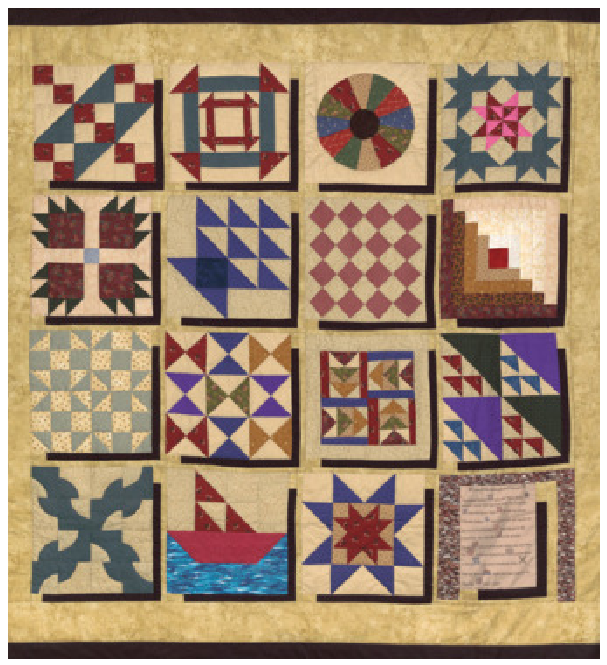












"Betty Hartley #1" (TOP LEFT) and "Woman in Yellow Dress" (TOP RIGHT) by Heather Cromwell and Myla Borden, respectively. "Underground Railroad Quilt Sampler" (BOTTOM RIGHT) by Heather Cromwell shows contemporary interpretations of the Underground Railroad "secret codes." Quilt detail (small squares), top row from LEFT: Log Cabin, a safe house; Jesus the Carpenter meant "steal away to Jesus," or begin the escape; Wagon Wheel meant load the wagon; Baskets, a symbol for replenishing supplies. Bottom row: Sailboat (LEFT) meant safe passage to freedom, often across the Great Lakes, and Flying Geese (RIGHT) signalled following geese as they fly north.

HEATHER CROMWELL; TOP RIGHT: MYLA BORDEN

Sunrise at the summit of Ha Ling Peak.

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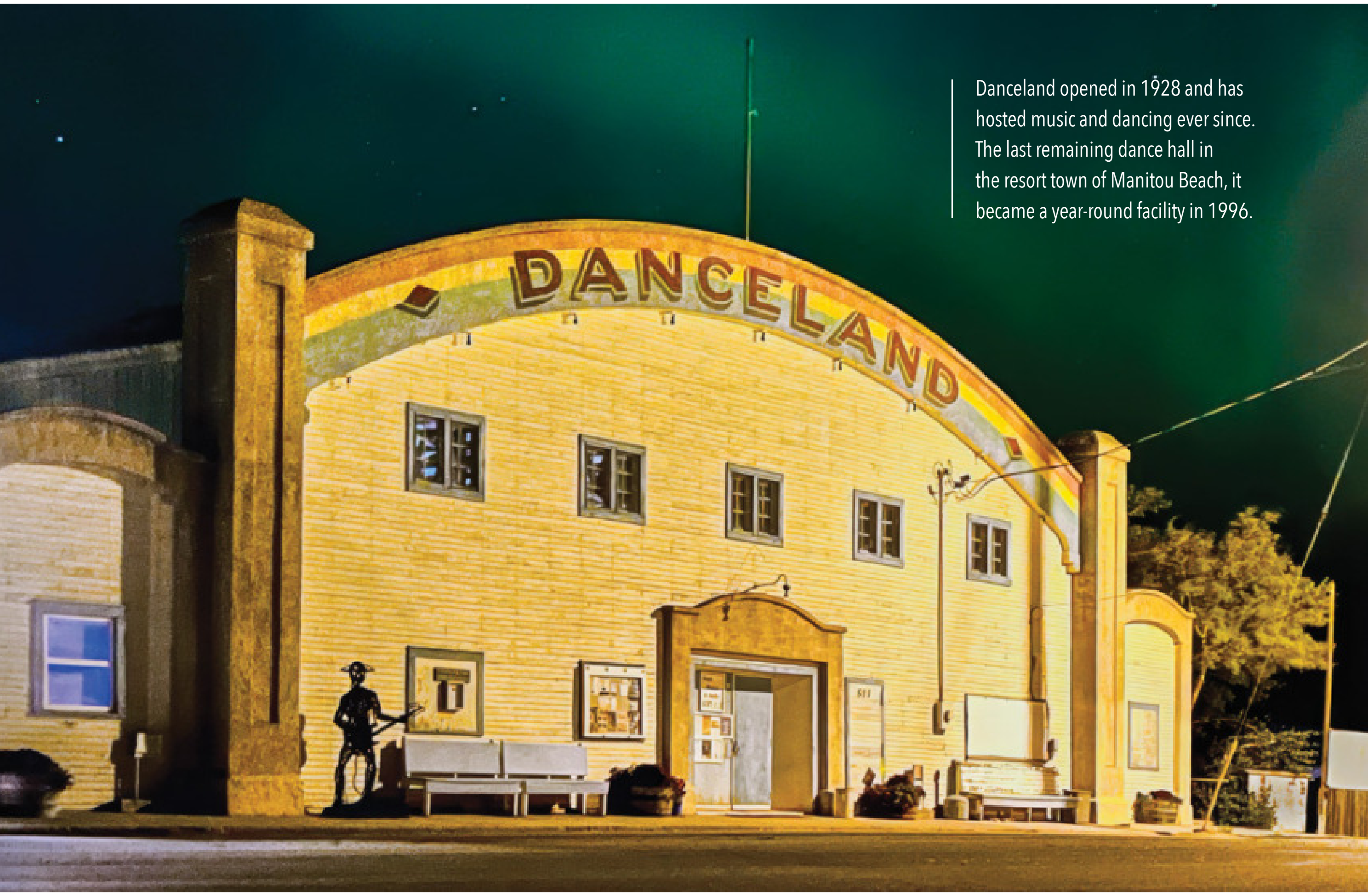
Dance the night

In Manitou Beach, Sask., Danceland welcomes revellers through the long, dark winter

BY **LOLA AUGUSTINE BROWN**



Danceland opened in 1928 and has hosted music and dancing ever since. The last remaining dance hall in the resort town of Manitou Beach, it became a year-round facility in 1996.

KARRÉ BATES

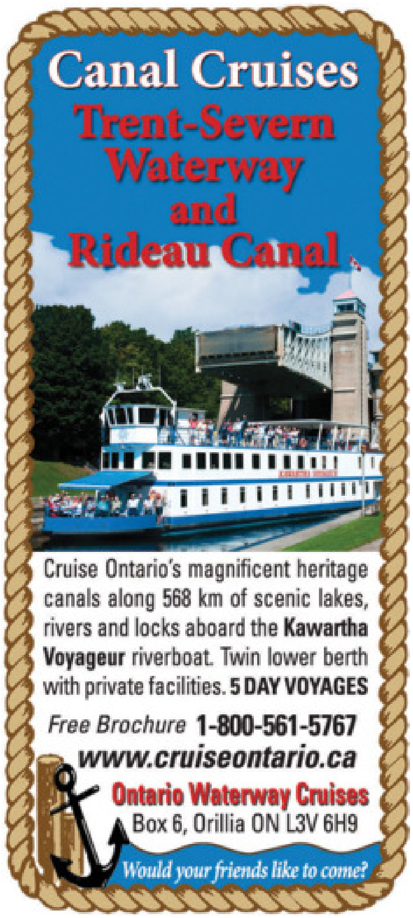
WHEN THE BAND PLAYS LOUD and dancers fly across the horsehair-sprung dancefloor of Danceland, the almost century-old building seems alive, pushing body heat and laughter out into the cold winter air. Revellers arrive by the busload from Regina — even as far away as Winnipeg and Edmonton, both a seven-hour-plus drive. Packed out for New Year's Eve and Valentine's Day dances, with healthy crowds streaming in for country nights and polka parties, there's plenty of life in this classic venue even when you have to drive through the ice and snow to get there.

"This is the last grand dance hall in North America. There's nothing like it. You only have to walk across that dancefloor and feel the bounce to know the difference," says musician Brian Sklar, who first played Danceland some 40 years ago and has been playing regularly with his Grammy-nominated polka band The Western Senators for almost 50 years.

Owner Millie Strueby and her late husband Arnold played in Danceland's house band, The Decades, in the '70s and '80s. Arnold had some experience running a venue — Millie first met him at the nightclub he owned in a shopping centre in Lanigan, Sask. The couple moved to Manitou Beach in 1980, and Arnold spent 12 years as the town mayor. They were in love with the community and its historic dance hall, so when it came up for sale in 2001, they bought it. The previous owners had insulated Danceland in 1996 to keep it warm through Saskatchewan's harsh winters, and once they took over, the Struebys promoted the dance hall as a year-round venue.

Manitou Beach, a summer resort town with a permanent population of 364, goes pretty quiet out of season — except for the crowds that come to Danceland for a night out that you just don't find in other places. A buffet meal is served before every dance (because not much else is open, and you'll need it after the long bus ride), then the music usually begins at 8 p.m. and plays on into the night.

Canada's "Polka King" Walter Ostanek has been playing Danceland for several decades, and headlines the annual summer polka fest. "Danceland has charisma, and I love going there," says the three-time Grammy winner and Order of Canada recipient. At 89, he says he's going to keep travelling from his home in St. Catharines, Ont., to play Danceland for as long as he can because of all the people he has met at Manitou Beach who return year after year. "I might be feeling tired, and my bones are creaking, but the minute I put the accordion on and I see people dancing, something inside of me wakes up, and away we go again," he says.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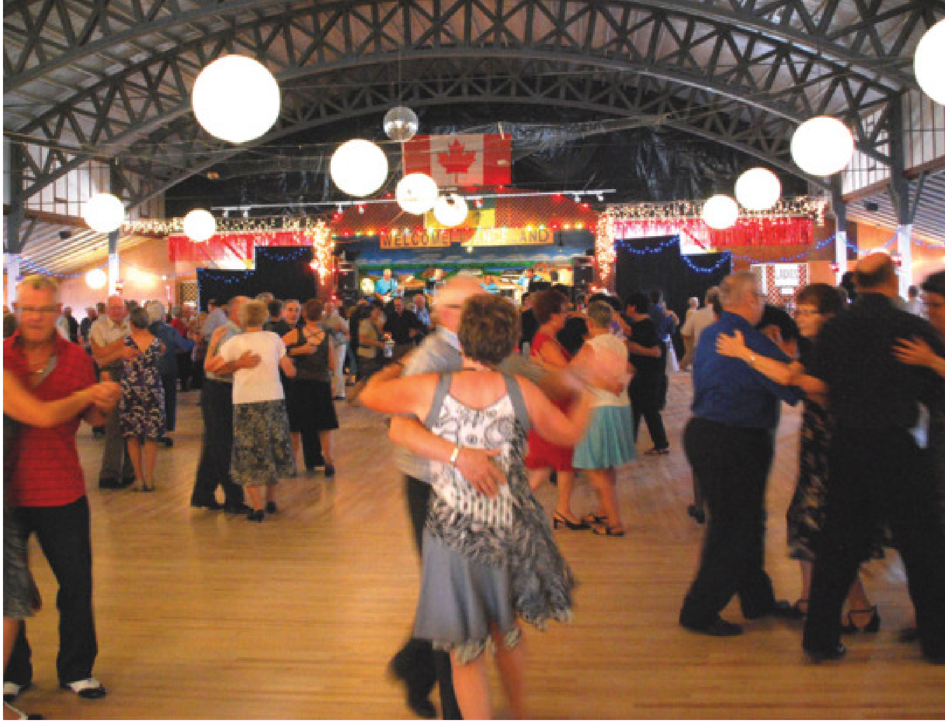
There are two different crowds that come to Danceland, explains Sklar: the traditionalists and the country crowd. Admittedly, some of the first group find his band's style too loud and too fast. "We're not your grandpa's polka band," he explains. "And I'll tell those who complain: you come here to dance, not visit; you can do that at home." When he plays Danceland, there are always requests for Johnny Cash, and a Texas two-step will always fill the dancefloor. His all-time favourite to get the crowd going is "Whiskey River." "We always play the original, the Johnny Bush version though," he says.

Singer Dianna Moroz started coming to Danceland 15 years ago and became friends with Strueby. She sings with bands under her stage name, Dyana, and doesn't mind the hour-and-a-half drive from her home in Saskatoon in winter to make it to Danceland. "Gosh, I've not missed a New Year's Eve here in all that time, and I go down most Saturdays to jam with the band," she says. "I can't say enough good about the warmth and the welcome of Manitou. I love this place — it's like a second home to me."


The magic of Danceland's renowned 460-square-metre dance floor comes from the cushion of horsehair that supports the original maple hardwood top.

As Danceland fans age, Strueby finds ways to keep the magic of Danceland going for future generations. The University of Saskatchewan's Ballroom Dance Association are regulars, and the venue has also hosted visiting country music artists and comedy nights. "We host lots of weddings too," explains Strueby. "Young people are blown away by the character and nostalgia of this building."

In the summer, Moroz runs Toonie Tuesdays, teaching old-time waltzes and polkas to kids, their parents and grandparents, along with the Birdie dance, the Macarena and the Gummy Bear Song.

Since it was built in 1928, Danceland has provided joy to many. Couples have fallen in love here: Strueby often meets visitors who tell her this is where their parents or grandparents met. Danceland is full of nostalgia — but also full of the promise of staying a beacon of light in this tiny town on cold winter nights for decades to come. ❂

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The photo in this advertisement was taken with a telephoto (zoom) lens and may appear closer to ice than we really were. We always keep a safe distance and follow mandated regulations.

Kingdom of ice

As Quebec City's Hôtel de Glace celebrates 25 years, a look at how the iconic structure comes together

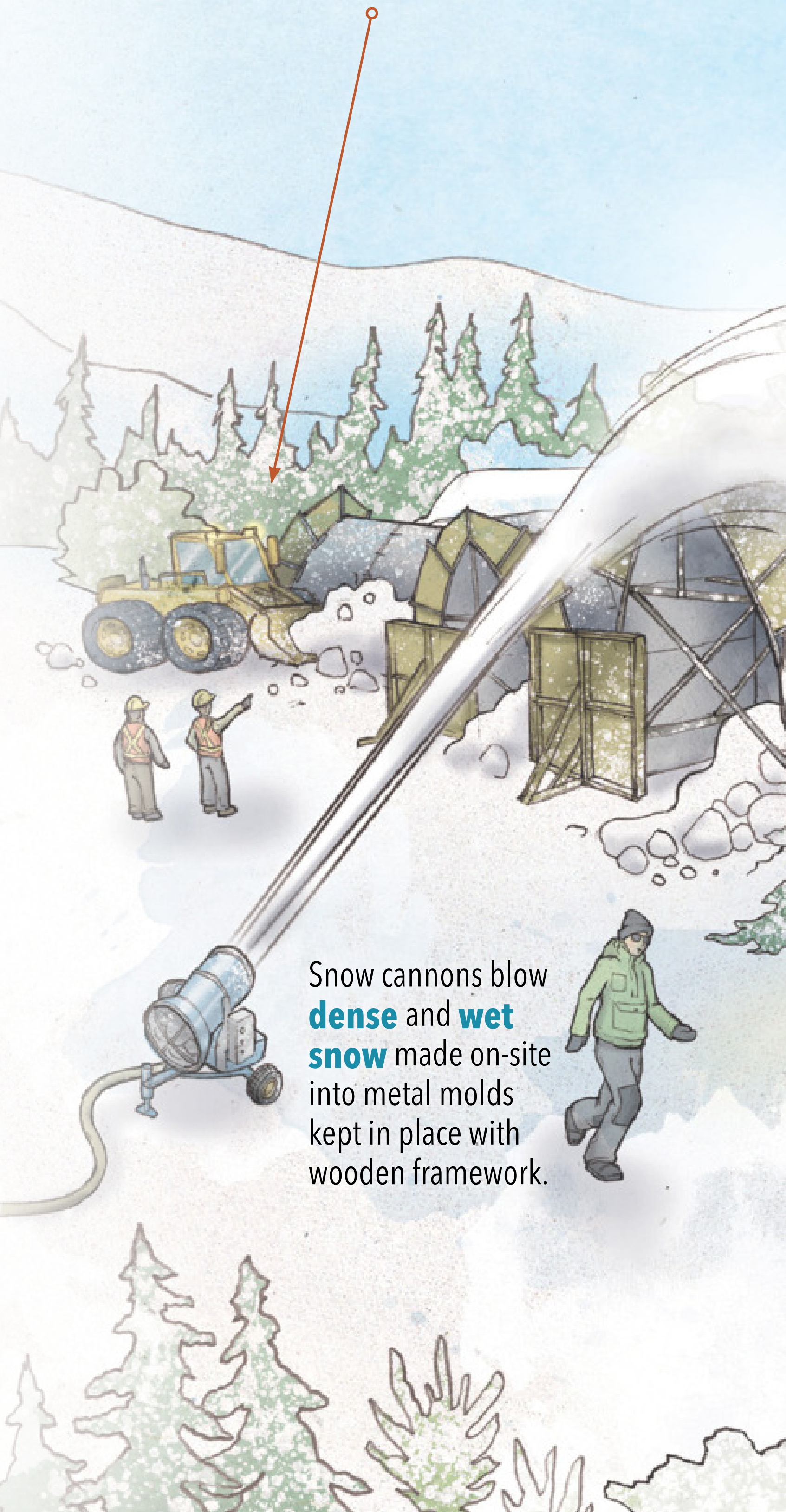
BY **MICHELA ROSANO**
WITH ILLUSTRATION BY **ANDY MORA**

Each January, when the haze of a new year clears, a hotel appears from the snow and ice outside Quebec City. As Hôtel de Glace celebrates its 25th anniversary this season, more than two million bundled-up visitors will have passed through its iconic doorways into an ephemeral kingdom of ice.

Winter after winter, the almost 4,300-square-metre architectural marvel, now located on the grounds of Village Vacances Valcartier, is built from the ground up to embody a new theme. On January 4, guests will enter an elemental realm of earth, air, fire and water. And because of this year's special anniversary, they will also crunch through the snow-covered hallways of a larger hotel to the star of the 2025 season: an ice restaurant. With the culinary team from Quebec City's Château Frontenac at the helm, the restaurant will serve three-course meals in an icy dining room and inspired by *la belle province*, complete with a "snowball" for dessert.

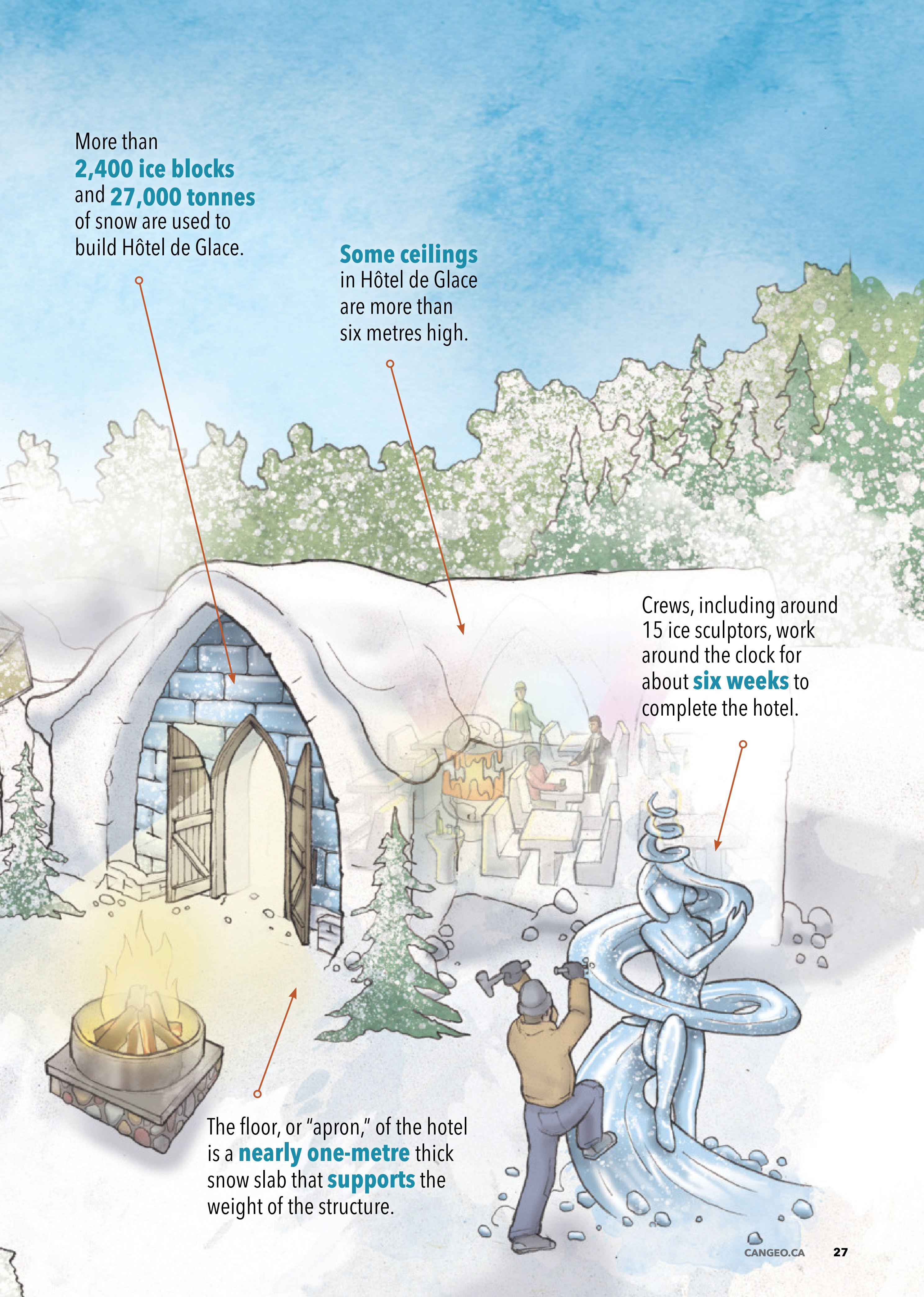
But it takes a lot of effort to look this good, as the team of about 50 workers who construct Hôtel de Glace each year know. Four months before opening day, art directors, architects and construction supervisors begin planning the structure. Then, once temperatures dip below zero for a full week — sometimes as early as November — sculptors, construction workers and electricians get busy laying the snow floor, securing and filling snow molds for walls and roofs, installing lights and beautifying this feat of engineering for the season ahead.

Then, when the sun breaks from the horizon and the snow begins to melt, usually by mid-March, Hôtel de Glace is shuttered and bulldozed to the ground. Like all good things, its end has come — until a new year beckons. ✲



After about three days of -5 C or colder temperatures, the snow freezes solid and the **molds** and **framework** are removed using heavy machinery.

Snow cannons blow **dense** and **wet snow** made on-site into metal molds kept in place with wooden framework.



More than **2,400 ice blocks** and **27,000 tonnes** of snow are used to build Hôtel de Glace.

Some ceilings in Hôtel de Glace are more than six metres high.

Crews, including around 15 ice sculptors, work around the clock for about **six weeks** to complete the hotel.

The floor, or "apron," of the hotel is a **nearly one-metre** thick snow slab that **supports** the weight of the structure.

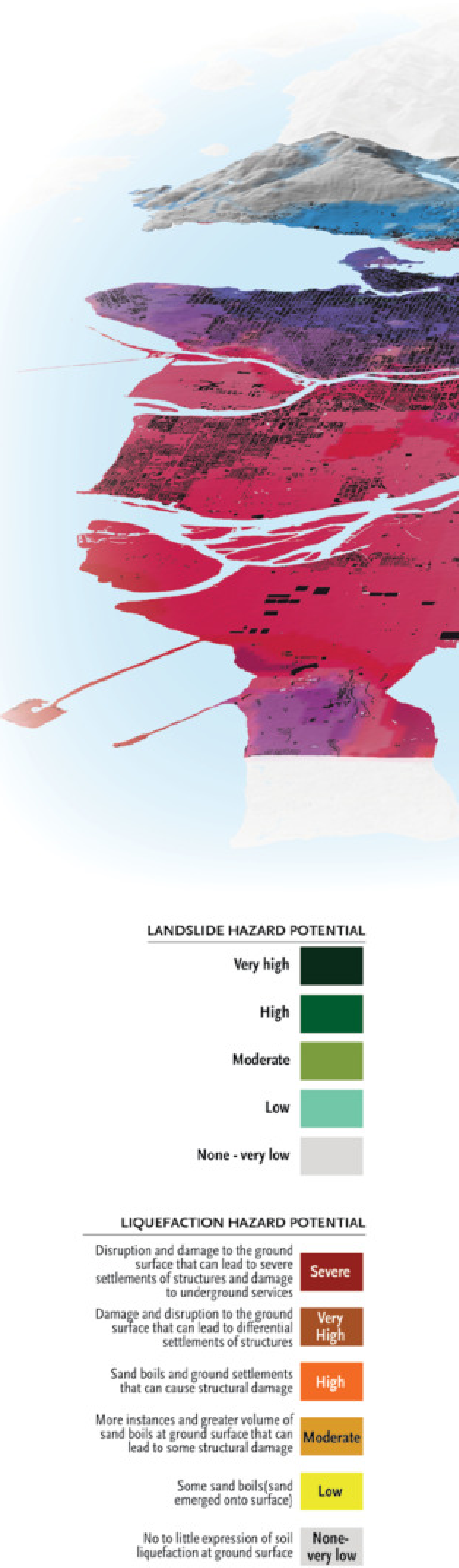
ON THE MAP

Exploring Cartography

Seismic shift

A new mapping project shows how earthquakes may travel through Metro Vancouver — and the hazards to prepare for

MAP BY **CHRIS BRACKLEY**
WITH TEXT BY **KATRIANNA DESANTE**


LANDSLIDE HAZARD POTENTIAL
Very high
High
Moderate
Low
None - very low
LIQUEFACTION HAZARD POTENTIAL
Disruption and damage to the ground surface that can lead to severe settlements of structures and damage to underground services
Severe
Damage and disruption to the ground surface that can lead to differential settlements of structures
Very High
Sand boils and ground settlements that can cause structural damage
High
More instances and greater volume of sand boils at ground surface that can lead to some structural damage
Moderate
Some sand boils (sand emerged onto surface)
Low
No to little expression of soil liquefaction at ground surface
None-very low

In a yellowing field in Maple Ridge, Vancouver, a Western University-led team sets off tiny "earthquakes." PhD student Benjamin Osei Fordjour lifts a sledgehammer and strikes the ground, sending seismic wavelengths skipping through the ground and down a tape measure lined with geophones. He is Thor, but wielder of earthquakes. In the centre of the field are a series of shallow holes where red seismometers, the size of small bricks, record the Earth's vibrations.

These field tests are part of the second phase of a 10-year study led by associate professor Sheri Molnar that is mapping how seismic hazards vary on a neighbourhood scale based on underlying ground conditions in Metro Vancouver. While pursuing postdoctoral work nearly a decade ago, Molnar was surprised to learn Metro Vancouver, one of Canada's most seismically active regions, lacked a comprehensive seismic microzonation map.

Vancouver is built on a deep basin of sedimentary, or layered, rock, patches of which may dampen, prolong or intensify seismic waves. For example, softer sediments tend to amplify earthquake motions. If an earthquake occurs, certain regions may be more susceptible to stronger shaking, which could contribute to landslides or liquefaction (when solid ground acts like a liquid).

So, Molnar set out to create a map that could "predict the amplitude and frequency of earthquake shaking." Since then, Molnar and the team have completed Phase I, measuring seismic vibrations at more than 2,300 locations and collecting geological data for 15,000 sites in Vancouver as far east as Surrey. They found that Vancouver's uplands feature complex geology, where seismic waves unexpectedly slow down before speeding up again as they move deeper into the stiffer Earth. This geology makes it hard to accurately predict earthquake ground motions (the Earth's movement in response to an earthquake).

The team has released 29 region-specific maps and made them accessible to the general public so emergency managers, city planners, architects and homeowners can consider hazards and how to mitigate them. Molnar's team plans to complete Phase II by 2026, creating a three-dimensional velocity model — the first of its kind.

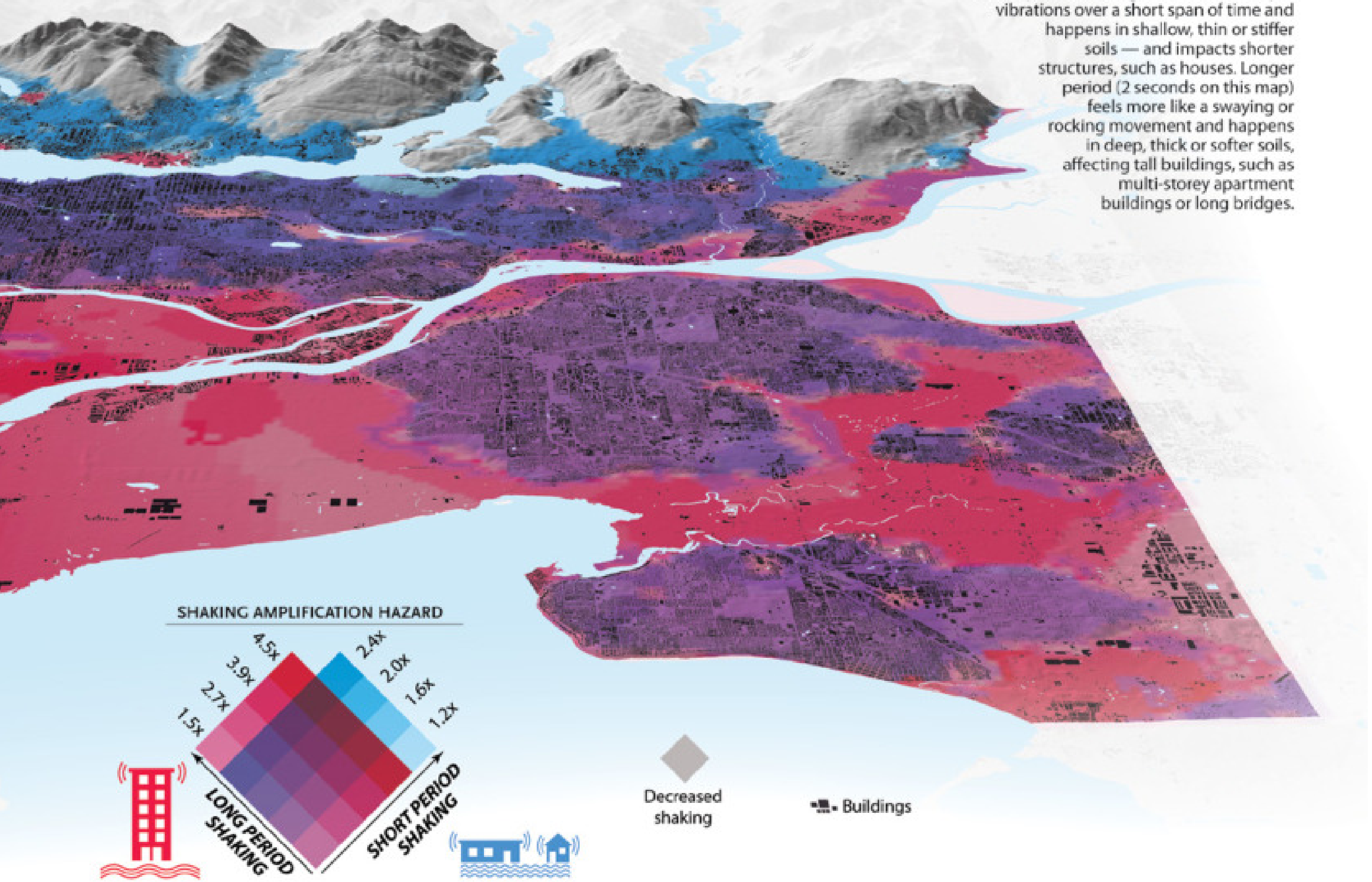
"For the public [...] it's not about not buying a home," Molnar says, "but being informed about what kind of earthquake insurance conversations you might want to have, and whether or not you might also experience landslides or liquefaction."

For many Vancouverites who worry about Vancouver's dreaded "big one," predicted to strike Vancouver within the next 200 years, better understanding seismic hazards can help with planning to reduce their impact — and perhaps allay a worry or two. ⊛

ELEVATION MODEL: JAPAN AEROSPACE EXPLORATION AGENCY (JAXA), 2024. BUILDING FOOTPRINT DATA: OPENSTREETMAP CONTRIBUTORS, 2024. MVSMMP MAPS AVAILABLE AT BOREALISDATA.CA/DATAVERSE/MVSMMP.
MVSMMP MAPS IN THIS ARTICLE: 13 (DOI.ORG/10.5683/SP3/X23A5D); MAP 15 (DOI.ORG/10.5683/SP3/WA6MER); 22 (DOI.ORG/10.5683/SP3/ZIPEZX); 26 (DOI.ORG/10.5683/SP3/ULMSX9).

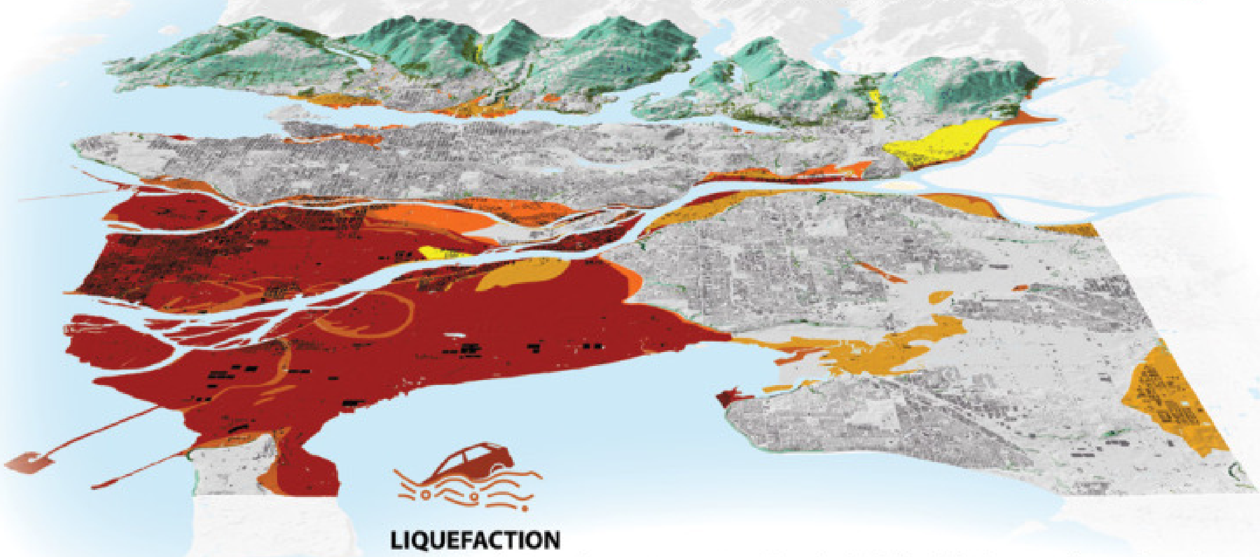
SHAKING

This map combines how both long and short period shaking would be "amplified" (increased) by natural, non-engineered ground conditions. Short period shaking feels more like rapid vibrations over a short span of time and happens in shallow, thin or stiffer soils — and impacts shorter structures, such as houses. Longer period (2 seconds on this map) feels more like a swaying or rocking movement and happens in deep, thick or softer soils, affecting tall buildings, such as multi-storey apartment buildings or long bridges.


SHAKING AMPLIFICATION HAZARD
4.5x
3.9x
2.7x
1.5x
2.4x
2.0x
1.6x
1.2x
LONG PERIOD SHAKING
SHORT PERIOD SHAKING
Decreased shaking
Buildings

LANDSLIDES

Depending on the seismic intensity, landslides — the movement of displaced rock, soil or debris down a slope — may be triggered in upland areas, such as the North Shore Mountains.



LIQUEFACTION

Liquefaction happens when pressure causes water-saturated soil particles to grow and separate, causing the soil to behave like a liquid. It's more likely in lowland areas close to water, such as the Fraser River delta. It can manifest as sand boiling, ground cracking or flow slides. Map data reflects natural non-engineered ground conditions. In many places, soil and slope engineering has been completed to mitigate effects.

Wings over Niagara

DURING THE WINTER, IT'S NOT ONLY HUMANS THAT FLOCK TO THE ICONIC FALLS; NIAGARA FALLS IS KNOWN AS THE GULL CAPITAL OF THE WORLD

STORY AND PHOTOGRAPHY BY **RYAN TIDMAN**

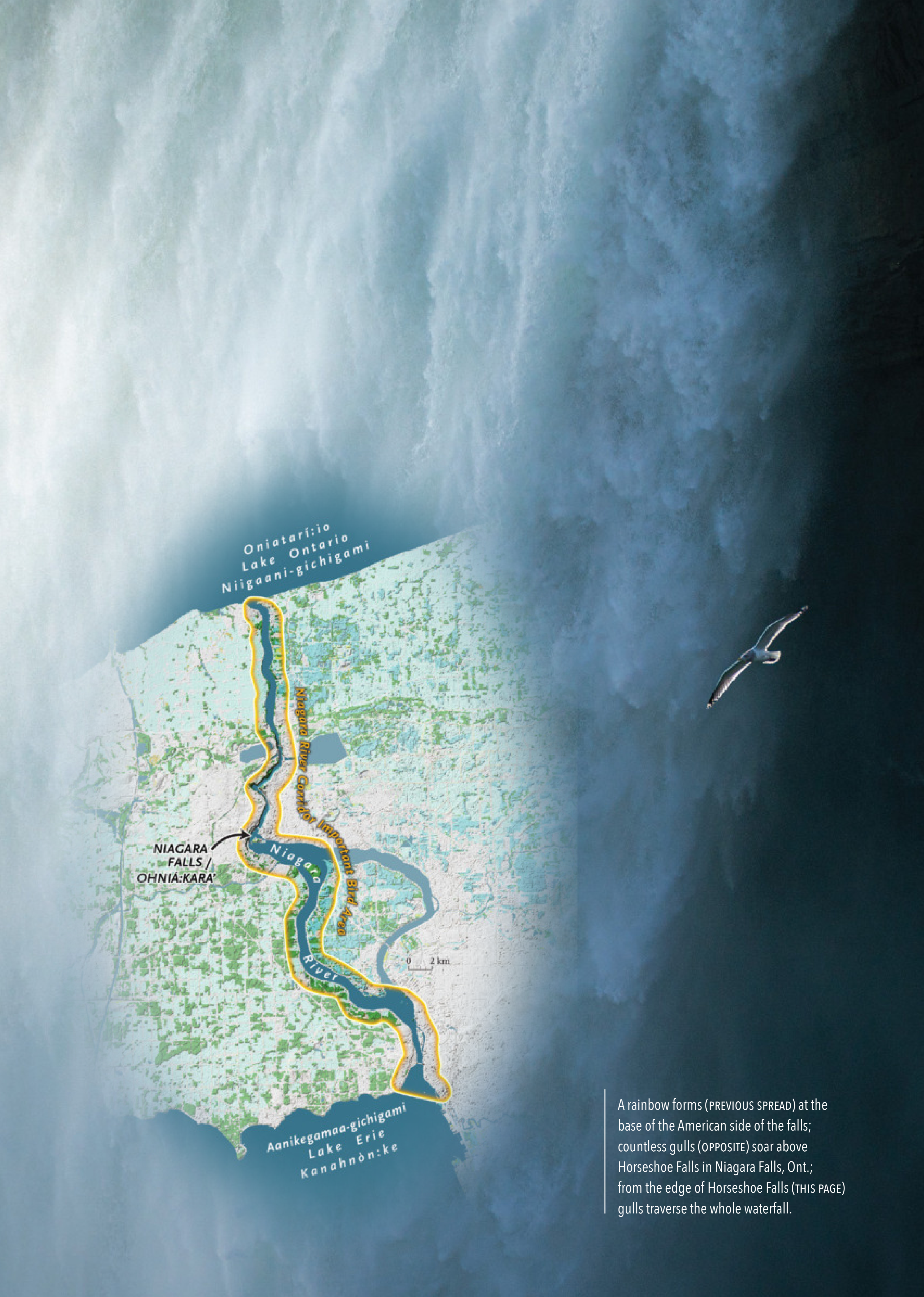
Growing up in Ontario, I took Niagara Falls for granted. I was fortunate to sightsee there with my family, attend countless school trips and cross the Peace Bridge every summer break to visit relatives in New York. To my younger self, Niagara Falls was nothing more than a bustling tourist hub — a place to watch a gull steal an unsuspecting visitor's hot dog or to catch an Elvis Presley impersonator on a street corner. Each year, roughly 12 million tourists from around the world flock to Niagara, a word that comes from the Mohawk Ohniá:kara' — "the neck" between Lakes Erie and Ontario. But humans aren't the only animals drawn to the thundering falls. Wildlife, too, has been making the journey to this extraordinary ecological corridor for millennia.

If you've ever visited the Niagara region, you've probably encountered somewhat pesky gulls — whether swooping in to snatch a snack, photobombing a family snapshot or speckling you with a white spray of bird poop. But these gulls are more than just opportunistic scavengers and scene-stealers. Niagara Falls is known among birdwatchers as the "gull capital of the world."

Thousands upon thousands of gulls gather here each winter, making it one of the largest and most diverse congregations of gulls on the planet. During the cold winter, more than 100,000 gulls can be counted in the Niagara region from up to 19 different species — with birders sometimes spotting up to 14 gull species in just one day.

"I was enchanted by the number of birds on the river," says birder Jean Iron, who has been visiting the Niagara River, searching for gulls along its shores, for about 30 years. "It's one of the wonders of the natural world. But it's also a wonder of the ornithological world."

Among the most remarkable sights are Bonaparte's gulls, with as many as 30,000 individuals seen in a single day. An estimated 25 per cent of the world's Bonaparte's gulls pass through the Niagara River corridor in the fall and early winter as they migrate south. Single-day counts of


Oniatarí:io
Lake Ontario
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Niagara River Corridor Important Bird Area
NIAGARA FALLS / OHNIÁ:KARA'
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Lake Erie
Kanahnòn:ke

A rainbow forms (PREVIOUS SPREAD) at the base of the American side of the falls; countless gulls (OPPOSITE) soar above Horseshoe Falls in Niagara Falls, Ont.; from the edge of Horseshoe Falls (THIS PAGE) gulls traverse the whole waterfall.

herring and ring-billed gulls, which both breed in the region, often exceed 20,000 for each. “There’s never a boring day here in November, December and January,” says Iron, who has led bird counts here for more than 15 years. “You can see the largest species of gull and the smallest species of gull on the same day.”

One of the main reasons Niagara is such a prominent location for gulls over the winter is the rapid, churning river system — and its waterfalls we chase. Many gulls that overwinter here start their migratory routes in the north or farther west inland. After autumn passes and the temperature dips below zero, water bodies that provide feasts for foraging through the spring and summer freeze, forcing many birds to begin their annual migrations if they haven’t left already.

Lots of birds head to warmer climates or the Atlantic Ocean, where food is not trapped under layers of ice. But while many lakes and rivers freeze over during the winter in much of the Great Lakes watershed, not so at Niagara Falls. The continual charging torrents of water flowing through the Niagara River corridor prevent ice from forming on the river. Horseshoe Falls has not frozen entirely since March 1848, when icefields shifted across Lake Erie, blocking the river’s flow for 30 unusually silent hours.

“Birds take the path of least resistance,” says field ornithologist Marcie Jacklin. “If they get far enough south with a reliable food source, there isn’t a reason to continue to migrate further.” Niagara provides an open-water oasis in an otherwise frozen frontier for the birds. However, the gulls require more than just open water; they need food.

“Birds wouldn’t be there if there wasn’t something for them to eat,” says Iron, who held the role of president of the Ontario Field Ornithologists for nine years. The Niagara River is fed by the nutrient-rich waters of Lake Erie, which supports thriving fish populations. “It’s a huge food source for birds,” says Iron. Flushing through the Niagara River are many species of fish ripe for the picking of these seasonal visitors: alewives, gizzard shad, smelt and emerald shiners. (Gulls also have access to other

Ryan Tidman (@ryantidman) is a conservation photographer based in Comox, B.C. He is a regular contributor to Canadian Geographic.

PREVIOUS SPREAD, MAP: CHRIS BRACKLEY/CAN GEO. DATA CREDITS: IMPORTANT BIRD AREA: MAP OF THE NIAGARA REGION IBAS, BIRDS CANADA.

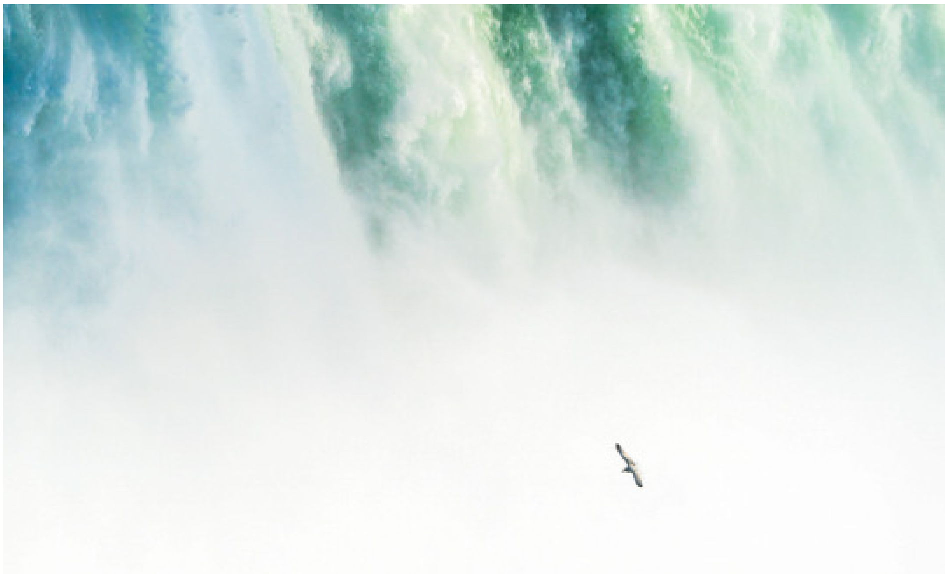
Clockwise from OPPOSITE: Good hunting opportunities draw thousands of gulls to the falls during winter; two birds scan the turbulent water for stunned fish that have been forced over the falls; a gull is dwarfed by cascading water; hovering above the surface of the water helps gulls locate fish in the rapids.

food sources Niagara inadvertently provides, like that tourist's hot dog or an all-you-can-eat buffet at the local dump.)

As fish are pulled through the strong currents above the falls, some get trapped and then pushed over the edge. The unlucky passengers soar down the roaring falls until they hit the water below. This impact momentarily stuns the fish — creating the perfect opportunity for the eagerly anticipating gulls as the churning waters are transformed into a prime feeding ground. This strategic exploitation by the gulls of the falls can be seen year-round but is heightened in the winter when food is scarce elsewhere and Niagara hosts seasonal feathered migrants.

The gulls have found another opportunistic food source thanks to a relationship with an unlikely partner: the Niagara Falls power turbines. Fish get sucked through the turbines and become mushed up, explains retired wildlife biologist Chip Weseloh (who has spent so much of his career working in the Niagara River corridor that there is a rocky island upstream, home to nesting herring gulls, that people refer to as Weseloh Rocks). The shredded fish floats to the surface, providing an easy meal for foraging gulls.

"Between the smaller fish getting stunned over the falls and the larger fish getting chopped up by the turbines, Niagara sort of acts as a fast-food restaurant for the gulls," Jacklin remarks.



Captured at sunset, the falls (OPPOSITE) are shrouded in their own golden mist; a view of New York state (ABOVE) from a vantage point on the Canadian side. The U.S. side of the Niagara River Corridor is designated as a Wetland of International Importance.

Jokes about their greed aside, gulls are an important part of the ecosystem. They help regulate the quality and quantity of fish in the water. They transfer nutrients from the water to the land. The congregation of gulls and other birds led to the area being designated an Important Bird Area in 1996. In 2019, the Niagara River Corridor was designated as a Ramsar Site, or a Wetland of International Importance on the U.S. side (the Canadian side is still awaiting designation; if this happens, it would be the first transboundary Ramsar site in North America). But the area and its ecosystem aren't comprehensively protected. Stretching 60 kilometres from Lake Erie to Lake Ontario, the corridor is a vital sanctuary not just for gulls but for a diversity of wildlife. Efforts are ongoing to protect the region from encroaching development and toxic pollutants.

Curious about their passion for gulls and the Niagara region, I ask Iron, Jacklin and Weseloh what has drawn them to a species many may see as a pest.

Iron laughs at the question and takes a second to think. Gulls have wonderfully expressive faces, she begins, before building up steam. They're large and easy to spot, and their plumage evolves as they age — often changing with the seasons. "They're an interesting challenge, and they're easy to see," she concludes.

Jacklin reminds me that even on the most unsuccessful birding days, the views along the Niagara are world-class, and being out in nature provides her with a sense of calmness and relaxation, almost as a form of mindfulness.

Weseloh mentions the rare opportunity to see a tufted titmouse, a small songbird whose northern range breaks into the Niagara region.

It's not only experts who are drawn to the shorelines and waterfalls to look for gulls during the winter spectacle. Each February, the Birds on the Niagara winter festival attracts everyone from devoted birders to folks who have never identified a bird in their lives. But all attendees have one thing in common: the desire to learn more. "I'm still learning something every year, even 35 years later!" Jacklin exclaims.

Maybe this year, you'll find me among them, marvelling at the countless wings over Niagara. ⎈

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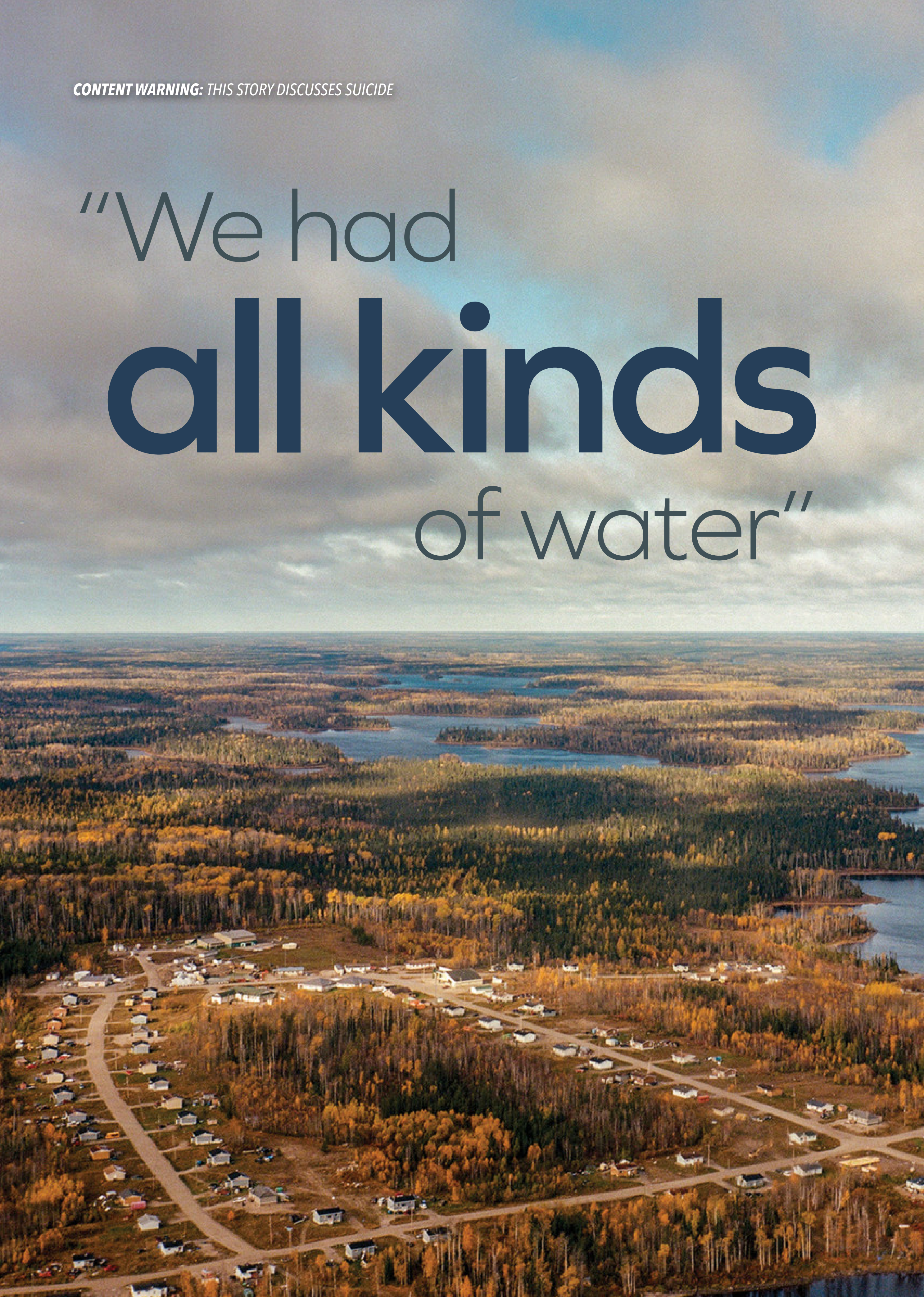
***CONTENT WARNING:** THIS STORY DISCUSSES SUICIDE*

"We had **all kinds** of water"



NESKANTAGA FIRST NATION HAS BEEN UNDER A BOIL WATER ADVISORY FOR 30 YEARS. THE TRAUMA OF AN ENTIRE GENERATION WITHOUT ACCESS TO SAFE DRINKING WATER HAS LEFT ITS MARK.

BY **BRANDI MORIN**
WITH PHOTOGRAPHY BY **SARA HYLTON**

TRAILS OF DUST chase vehicles along gravel roads in Neskantaga First Nation on a sweltering mid-August morning. The northwestern Ontario community is alive with excitement. Its annual summer festival is underway, a vibrant week-long celebration featuring daily communal meals, contests with cash prizes, bingo games, music, dancing and a traditional fishing derby.

Derek Moonias, 48, drives his beat-up half-ton to the tiny airport 12 kilometres outside the townsite to collect a delivery of bottled water. His three-year-old grandson, Pearson, tags along. It's a commute Moonias, Neskantaga's water distribution coordinator, makes several times a week. Usually, he'd use his allocated cargo van, but it's stuck in a ditch waiting for a tow because he took a wrong turn the day before delivering water to a resident.

"I'm so tired mentally that I'm about to collapse," says Moonias, who's responsible for distributing bottled water to about 300 people in around 80 households. But this week he's on double duty, placing extra orders to accommodate the celebration, plus volunteering where he's needed at the festival.

The celebration is a break for most, says Moonias. It's an opportunity for community members to shift their focus from crisis mode to hope. Because for the last 30 years this February, people in Neskantaga haven't been able to trust the water coming from their taps. The community is home to Canada's longest boil water advisory, in place since 1995. The predicament stems from aging infrastructure, contamination problems and a lack of adequate resources for maintenance and upgrades to the water treatment facility.

Although it's borne the longest burden, Neskantaga isn't alone in its water crisis. Dozens of First Nations in Canada do not have adequate access to clean and safe water, a fundamental human right declared by the United Nations General Assembly in 2010. Decades of inadequate investment in water infrastructure and treatment facilities — rooted in Canada's historical neglect of Indigenous communities and systemic racism stemming from the 1876 Indian Act — have left many First Nations communities with outdated or

non-functioning systems. According to the advocacy group The Council of Canadians, 73 per cent of First Nations water systems across the country are at medium or high risk of contamination.

Nestled along the banks of Attawapiskat Lake and the Otoskwin River, 436 kilometres northeast of Thunder Bay, Ont., Neskantaga is accessible only by plane or winter road. The irony of the First Nation being situated along the shores of a lake and surrounded by a labyrinth of fresh water is palpable.

"Why can't we be like any other cities or towns where we use tap water? When are we going to be normal like everybody else? We're just bottle people. But we're humans too," laments Moonias.

As the water distribution coordinator, Moonias meticulously keeps track of each household, including how many people live there and how much water they need. He makes lists in a black pocketbook after querying door to door, then calls in or emails the water orders to a supplier in Thunder Bay. Throughout the week, Moonias picks up 25 or more boxes of various sizes of bottled water, paid for by the federal government, when the plane lands at the airport.

"We're treated like garbage." Moonias shakes his head while gesturing to his grandson in the back seat. He stops the truck and points to rashes on Pearson's legs. Although the toddler's only been back home in Neskantaga for a couple of weeks, Moonias says, he's already reacting to bathing in the tap water here, an issue echoed by other community members for which no one really has a definitive explanation. Since 2020, according to government testing, Neskantaga's newly upgraded water treatment facility has been producing clean water.

Moonias has deep scars that are more than a decade old, along with fresh sores on his body that he says come from exposure to the tap water.

Brandi Morin (@bmorinstories) is an award-winning Cree, Iroquois and French journalist from Treaty 6 territory, Alberta. Sara Hylton (@sarahyltonphoto) is an acclaimed freelance photographer. This series of photos, completed in 2022, was supported by the Trebek Initiative. trebekinitiative.com

He counts the bloodied wounds on his arms then removes his socks to show the scabby bottoms of his feet.

"I'm so embarrassed by these," he says of his scars. "We're not treated fairly. All we ask for is clean water."

A COMMUTER AIRCRAFT touches down at Neskantaga's small airport to drop off dozens of community members who don't live on the reserve. They've flown home for the festival to reconnect with their families and culture. Passengers are lined up at a checkpoint set up behind plastic folding tables, while airport staff, supported by officers with the Nishnawbe Aski Police Service, search their luggage in an effort to prevent drugs and alcohol from entering the community. It's a tribal policy enacted to help protect members from further crises.

The persistent lack of clean water — what amounts to a generation never having drinkable water out of the taps — has exacerbated mental health issues and social problems in Neskantaga. The community, like many Indigenous communities across the country, lacks adequate housing, and overcrowding is an issue, with reports of two or three families living in one house. Now another epidemic affects the lives of residents here: suicide. The band declared a state of emergency in 2013 after several suicides and numerous attempted suicides by youth. Since then, more young people have been lost to suicide, drug overdoses and sudden death. The state of emergency has never been lifted.

Neskantaga First Nation (PREVIOUS and OPPOSITE). Derek Moonias (ABOVE) is responsible for delivering bottled water to about 300 community members.

Moonias drives to the graveyard, tucked away along a winding forest road a few kilometres from the reserve. Weathered headstones contrast with mounds of soil piled onto fresh graves bearing plastic flowers and framed photographs of deceased loved ones.

"Suicide ... suicide ... that whole row is suicide ... drug overdose." Moonias points to rows of graves, many of whom are his relatives.

"This whole row here are my siblings, niece and nephews.... We have a lot of pain in this graveyard."

Moonias has come through trials of his own, having spent five years in a federal prison for attempted murder and other charges following an incident in 2015. He'd barricaded himself in his home with a gun and shot it into the air when police arrived to check up on him.

He says the incident occurred after the deaths of two of his siblings and several other relatives, along with the resurfacing of sexual abuse he'd experienced as a child.

"I broke down. But prison was the best thing that happened in my life. I remember what the judge told me: 'Mr. Moonias, I see a broken soul. I see emptiness in you. No hope. If I gave you a second chance, would you take it?' And I told the judge I would do whatever I can to turn my life around."

While in prison, Moonias enrolled in a healing lodge program and began participating in sweat lodge ceremonies and addressing past trauma.

"When I got home, I got accepted back [into the community], and since then, I've dedicated my life to my reserve. I took my second chance: I'm sober, I'm drug free and I'm working for them. I do whatever I can for them."

Moonias lights a cigarette and perches it next to the headstone of his late niece.

"She always used to tell me, 'Make sure you light up a cigarette by my grave.' I come and visit here a lot."

Looking around the cemetery, Moonias is heartbroken. He equates many of the deaths to the water crisis.

"A lot of them fought for water. And they gave up because they felt hopeless. My brother's here, too. He advocated for clean water, but he gave up because he felt like a failure."

His grandson inquisitively wanders through the rows. Moonias picks him up by a grave and whispers to him. "You miss uncle? Uncle is in another place. We'll see him when our time is up. Right now we have to fight in this world."

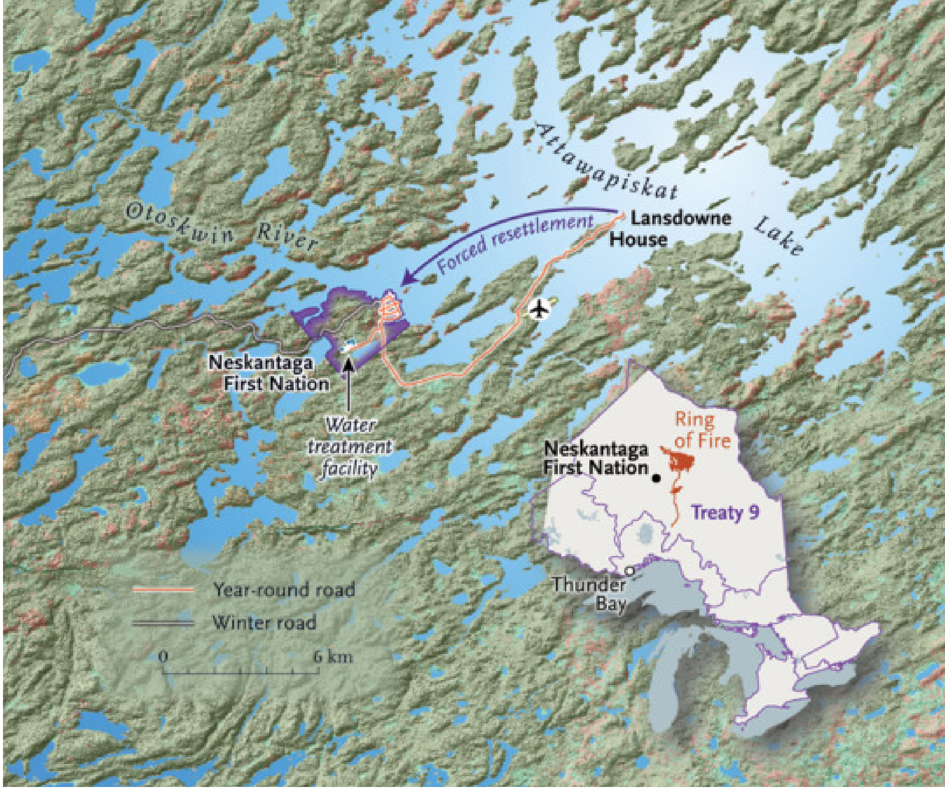
AT THE LOCAL ELDERS FACILITY, 84-year-old Leo Moonias slowly rises from his worn armchair. His gnarled hands grip a battered walker as he shuffles toward the door. His small living space is dimly lit, with the flickering of his TV playing an old western turned up too loud.

Leo's weathered face is a map of the community's struggles; each line tells a story of resilience in the face of hardship. His deep brown eyes are distant and reflective as he reminisces about growing up on the territory hunting, fishing and trapping with his parents and extended family. His adopted son Brad Moonias sits beside him in a wooden chair and translates questions for him into Anishinaabemowin.

It was a tough way of life, Leo responds in English, but they were nourished and strong.

"We had all kinds of water," he says, referring to freshwater sources they accessed, such as springs. "Wherever

Elder Leo Moonias (TOP LEFT) remembers when the community was relocated to the current townsite in the early 1990s. Before that, he says, they "had all kinds of water" (BOTTOM LEFT). A sign outside a home (BOTTOM RIGHT) speaks to their frustration.



you went [on the land], you saw good water," Leo gestures with his arms towards the river outside his window, eyes widened with enthusiasm. "And we were healthy too."

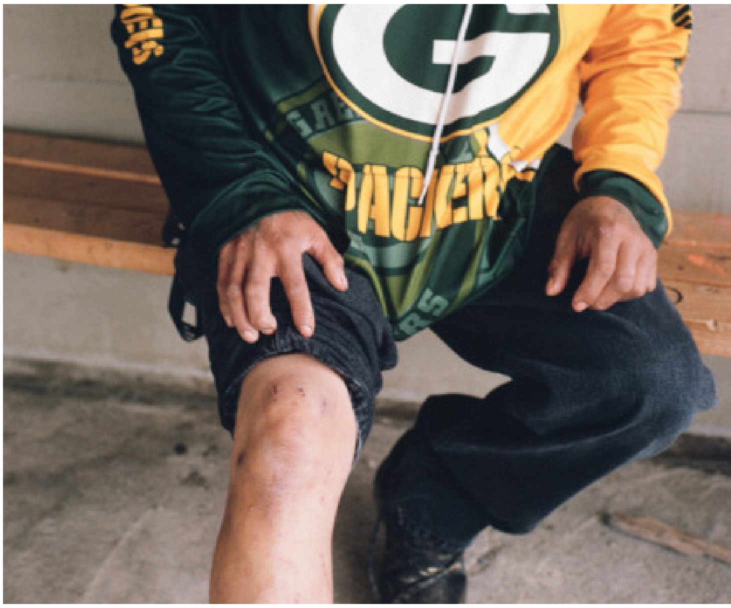
Historically, the people of Neskantaga lived on the lands and waters surrounding the Attawapiskat River. According to a 2019 lawsuit filed by Neskantaga First Nation and Curve Lake First Nation against Canada over their prolonged drinking water advisories, the federal government forced Neskantaga members to the settlement of Lansdowne House, 20 minutes east of the current townsite, in the 1950s in order for their children to attend mandatory day schools. There, if community members didn't get water from the land, they had to boil water from Attawapiskat Lake, where decomposing organic matter and other natural compounds cloud the water and make it unsuitable for drinking unless boiled. The Indian Affairs agency office and the Health Canada nursing station had clean drinking water available to federal personnel; community members were not allowed to access this water, according to the lawsuit.

Then, in the 1980s, due to persistent flooding and crumbling infrastructure, the community was uprooted from Lansdowne House to the current townsite. One of the incentives the federal government offered for the move, says Leo, was the promise of clean, running water in every home.

The relocation was mostly completed by the early 1990s, and the federal government, through what was then known as Indian Affairs, funded the construction of a water treatment plant. It was a natural sand, slow-filter system drawing water from the lake. This type of water treatment system, while considered a relatively economical, safe and reliable system elsewhere, requires highly skilled operators and is often not appropriate for water sources with lots of sediment and high turbidity — water in Attawapiskat Lake is often yellow or brown and considered to have high turbidity. The system is also less effective at removing microorganisms from cold water — not suited for the climate conditions in the northern Ontario community — and must be monitored and cleaned to ensure it is functioning properly. According to Neskantaga's lawsuit, this system was experimental and untested at the time. "Meanwhile, federal personnel stationed in Neskantaga were provided with a separate, fully functional clean water system," read their statement of claim.

Leo says he celebrated when Neskantaga first received running water. "I was really happy when the water was running at my place that time."

MAPS, THIS SPREAD AND NEXT: CHRIS BRACKLEY/CAN GEO. DATA FOR BOIL WATER ADVISORY MAP: INDIGENOUS SERVICES CANADA, OCTOBER, 2024, SAC-ISC.GC.CA/ENG/1620925418298/1620925434679#



Clockwise from TOP LEFT: Derek Moonias sifts through bottled water flown in by the federal government; Moonias shows the sores he has developed, he says, from bathing in the tap water; Wilfred Sakanee, a water plant operator, fills a canister with water from a reverse osmosis system; Martin Anges boils water to bathe his newborn baby.

But the optimism was short-lived. A few months later, on February 1, 1995, it became clear that the new facility was failing to adequately disinfect the water. A boil water advisory was issued by the community and the government. The water was also testing high for trihalomethanes, harmful by products of sodium hypochlorite disinfection that, with long-term exposure, have been linked to a higher risk of certain cancers.

A report conducted by the department following the system's failure cited design flaws and a lack of proper maintenance. The water still flowed from the taps, but it was the colour of ginger ale and could have contained any number of contaminants in addition to trihalomethanes, interfering "with everything from basic hygiene to Neskantaga's traditional cultural and spiritual practices, which revolve around water," states the community's lawsuit.

In 2005, the government funded a temporary reverse-osmosis water treatment unit. While the slow-working unit located at the end of the community produced safe drinking water, it placed the community "lower on the priority list for water system upgrades," according to the lawsuit.

And so it stayed until 2017, when the federal government pledged to end all long-term drinking water advisories on public systems on reserves by March 2021. That year, it allocated $8.8 million to build a new, state-of-the-art conventional water treatment plant in Neskantaga. The plant was completed in 2019, after multiple delays and problems, and is far more complex to operate. Shortly after, that plant failed as well, because of a broken water pump. According to the government, it was back up and running and producing clean water in 2020. However, the chief and council decided to keep Neskantaga's boil water advisory in effect.

All these disruptions have had a cumulative impact. Over the years, the community's school has been periodically shut down due to a lack of running water, disrupting children's education. The entire community has been evacuated twice in the last five years over water safety concerns.

While the federal government has made progress recently, lifting 146 of Canada's long-term drinking water advisories since 2015, it hasn't provided a single, comprehensive estimate of when the advisories will be lifted or of the losses incurred by communities to fully address the drinking water crisis on all First Nation reserves. In 2023, Indigenous Services Canada reported that the government had invested over $5.6 billion since 2016 to support water and wastewater infrastructure on reserves. But a 2021 report by the auditor general noted that despite these investments, "overall, Indigenous Services Canada did not provide the support necessary to ensure that First Nations have ongoing access to safe drinking water."

> “**Reconciliation** IS JUST A FANCY WORD USED BY POLITICIANS TO THE MEDIA. THE WAY I SEE IT, **we're not even there yet**.”

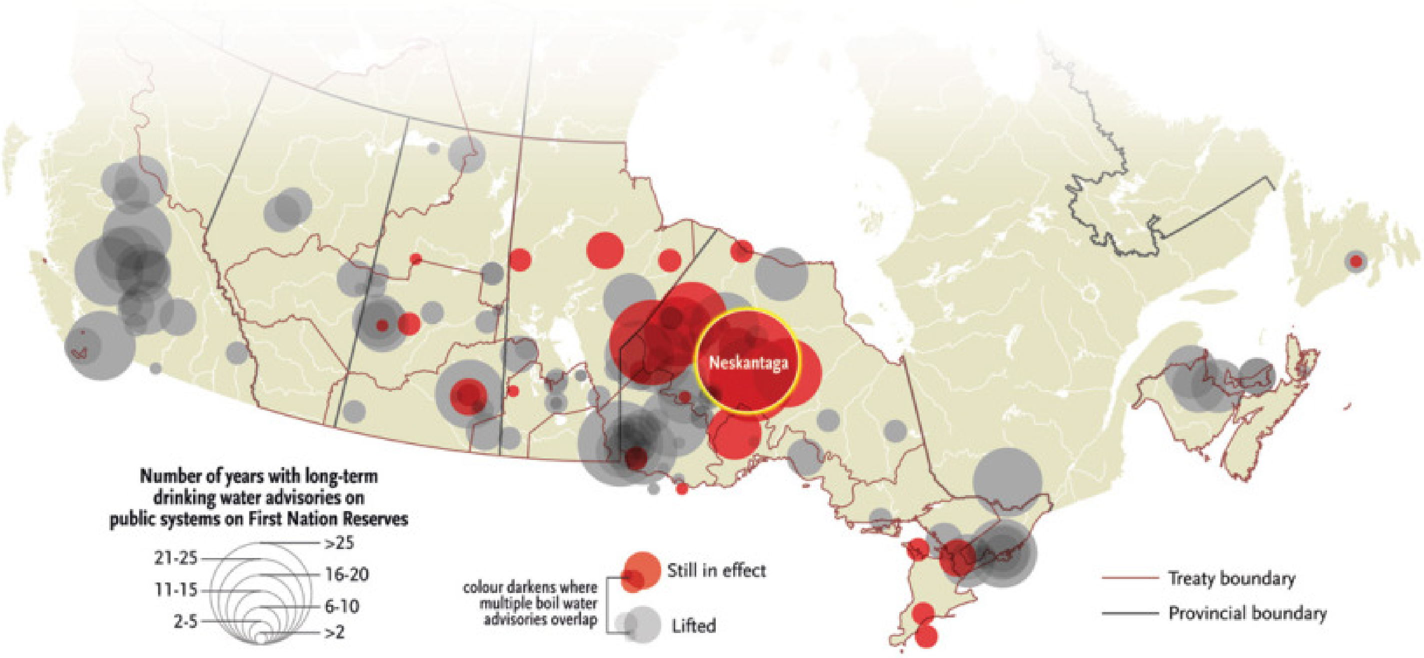
As of November 2024, there were still dozens of short-term boil water advisories across the country and 32 long-term advisories.

DOZENS OF FESTIVAL goers converge on a grassy field near the water, cheering on competitors of a shoe-throwing game. Marcus Moonias, 33, is sitting in his pickup truck near what community members call "the point" on the tip of the Attawapiskat Lake. The rugged shoreline is dotted with stunted spruce and cedar trees, their branches reaching out over the lake. A wooden dock juts out into the water, and a few aluminum boats are moored nearby.

"It's a beautiful community here. The people are great," he says. "But just like any reserve, life is hard. We don't have the access to services, education and health."

Marcus was the water treatment plant operator from 2017 to 2021. In October 2020, he discovered a suspicious looking sheen in the treatment facility's reservoir.

"I knew something wasn't right," he says. "So, I called the chief and told him. We didn't want to take any chances. He decided to make the call to evacuate everyone until they figured out what was wrong."


Neskantaga
Number of years with long-term drinking water advisories on public systems on First Nation Reserves
>25
21-25
16-20
11-15
6-10
2-5
>2
colour darkens where multiple boil water advisories overlap
Still in effect
Lifted
Treaty boundary
Provincial boundary

THIS PAGE: THE CANADIAN PRESS/CHRIS YOUNG

At the height of the COVID-19 pandemic, nearly 300 people, including Elders and children, were evacuated to hotels in Thunder Bay, where they stayed for two months. Despite the city's potable water, members of the community opted for bottled, Chief Chris Moonias told the CBC at the time.

Ultimately, the CBC reported, it was mineral oil from a broken pump seal that caused the oily sheen; the pump was replaced.

But no one in Neskantaga ever really lets their guard down, says Marcus, who is also a former elected band councillor and father of three young daughters.

"Even when I go to Toronto or Thunder Bay, I don't drink water from the tap," he says. "It's programmed in my mind that my water is not safe."

"Why did it take so long [to get clean drinking water]?" posits Marcus. "Reconciliation is just a fancy word that politicians use in the media. The way I see things is: we're not even there yet... until we see high schools up north, a proper health centre, more houses. We have 100 people in a backlog that want to return [to Neskantaga], but we're at capacity because of our hydro plant, we don't have lots, and it costs about a million dollars to build a house here anyways."

For many residents, one thing that remains intact is the connection with their ancestral way of life.

"I just go wander the bush. I go geese and moose hunting," says Marcus. "Being an Anishinaabe person, we're born to protect the land. That's just who we are. Our identity is the land, the water; to hunt, to fish, to practice our way of life. Most of our people see it as healing. You're free out there."

> "**How long** IS IT GOING TO TAKE FOR THE PEOPLE TO **trust** THE WATER?"

Neskantaga Chief Chris Moonias was also raised in the traditions of his ancestors, learning to hunt, fish and trap on the vast territory surrounding Attawapiskat Lake. From a young age, he absorbed the teachings of his parents and Elders, developing a deep connection to the land and waters that have sustained his people for generations.

Chief Moonias says he's fed up with his community living in a constant state of emergency. He has steadily sparred with the federal government over getting the water issue resolved during his two-term role as chief.

"We want to be heard," he says from his desk in the band office on the reserve. "You know, my father stood against the government, against residential schools. He wouldn't allow it. He was threatened that his benefits would be cut off, but he did it anyway and raised us kids on the land. Maybe that's the reason why I am the way I am. I stand up for the people, and I advocate hard."

Chief Moonias helped oversee the lawsuit filed against Canada in 2019 by Neskantaga and Curve Lake. Another case was filed in Manitoba's

Chief Chris Moonias (LEFT) is fed up with living in a constant state of emergency. For many, like Landon Moonias (RIGHT), the ancestral way of life is vital. Amanda Moonias (BOTTOM RIGHT) delivers extra water to the home of a newborn baby.

superior court by Tataskweyak Cree Nation in the same year. The lawsuits amalgamated to include a class action on behalf of all First Nations across Canada subject to drinking water advisories. The primary allegation was that Canada violated its responsibilities to First Nations and their members by not providing clean water to reserve communities. It was also claimed that Canada acted negligently, failed to uphold its fiduciary duties, violated the honour of the Crown and breached several rights outlined in the Canadian Charter of Rights and Freedoms. In 2021, the government of Canada offered a settlement deal of about $8 billion to 120 First Nations communities eligible for funds to improve their water systems, including the costs of building, operating and maintaining infrastructure. The settlement also included 142,000 people from 258 First Nations eligible for individual compensation.

But while government testing shows that Neskantaga's upgraded water treatment facility has been producing clean water since 2020, the trauma of living nearly three decades without access to safe drinking water has left its mark, and the healing process could take generations. The community has opted to keep the boil water advisory for now.

"There's the mental health portion of it — it's going to be a long process. It's been 10,870 days [as of November 2024] since the boil water advisory was issued. How long is it going to take for the people to trust the water?" says the chief. "Why do I bring children home almost every year by coffin

Filane's
Filane's
Filane's
Filane's
Filane's

that went away from here? Why did I have to bring my best friend home to bury him when he was approved for home dialysis, but he couldn't come home because of the boil water advisory? Why do I bring Elders home almost every month? Because they die of loneliness in Thunder Bay [where they have to go] because there's no services here."

Minister of Indigenous Services Patty Hajdu says the water crisis in Neskantaga is emblematic of the long-standing frayed relationship between First Nations and Canada.

"There's still a long way to go in terms of reconciliation," Hajdu says. Going in, "you're representing a colonial government that has inflicted a tremendous harm on First Nations as part of many policies over the years that have led to the situation we find ourselves in today."

"In terms of the plant itself, it's substantially complete. But the community has a high degree of distrust. How could they trust the water [after everything they've been through]?" Hajdu says.

She points to water quality tests completed in 2020 by environmental public health officers that determined that the plant was producing water that met the guidelines for Canadian drinking water quality, despite elevated levels of chlorite, a residual from the disinfecting process.

"Chlorite does not usually result in a drinking water advisory in other communities. But given Neskantaga's reasonable fear of water, the chief and council have made the decision not to lift the advisory until they feel completely comfortable," says Hajdu.

The current upgraded water treatment plant in Neskantaga has about 10 years of operational life left, added Hajdu. However, the minister says her government is financially backing Neskantaga in the design phase of a brand new one.

In the meantime, residents are still getting sick and developing sores, says Chief Moonias.

"A lot of people still get sores, rashes," he says, itching the skin on his arm, which he says is irritated from showering in Neskantaga. "When I leave town for my business trips, the rash disappears."

While it's unclear what is causing these skin issues, other issues in Neskantaga, such as overcrowding and not trusting the water to bathe in, could be contributing factors.

Still, one of the biggest issues with water quality in Indigenous communities in Canada is that there are no clean drinking water regulations.

"The quality of our water is not regulated," says Chief Moonias. "There are no standards to go by. Ontario has standards, Canada has standards, but First Nations don't."

While provinces regulate drinking water off-reserve, First Nations fall under federal jurisdiction, creating a regulatory gap. And the federal government hasn't implemented comprehensive water quality regulations specifically for reserves, leaving First Nations without the same legal protections for safe drinking water that other Canadians enjoy.

Hajdu is hopeful Bill C-61, the proposed First Nations Clean Water Act, which she introduced in 2023 after years of advocacy by Indigenous leaders, will soon receive royal assent. The legislation will be operated independent of the Indian Act and commits the federal government to provide "adequate and sustainable funding" for

Clayton John Moonias (left, TOP LEFT) with his sons Leighton and Landon, out on the land (ABOVE), just downstream from the Ring of Fire development. An orange t-shirt (BOTTOM LEFT) shows solidarity for the thousands of Indigenous children who were sent to residential schools.

water services, with minimum levels set by the recent settlement agreement on long-term drinking water advisories.

Training community members to operate the new complex computerized water treatment plant is another barrier in a small community like Neskantaga. To help bridge the gap, Indigenous Services Canada finances the Ontario Clean Water Agency to provide full-time operational oversight of the water system and to train local operators.

WHILE CHIEF MOONIAS spends most of his energy addressing the traumas of the inequities in Neskantaga, another threat to their well-being is on the horizon. Ontario's Ring of Fire region is only about 100 kilometres upstream. The area of vast boreal forest, home to diverse wildlife and extensive wetlands, including one of the world's largest peatland complexes that plays a crucial role in carbon sequestration and natural water filtration, is largely undeveloped, with no all-season roads connecting it to the rest of Ontario.

It's also teeming with mineral deposits like chromite, nickel, copper and platinum, used for electric vehicle batteries and manufacturing, and valued at upwards of $90 billion.

> "THE QUALITY OF OUR WATER IS NOT **regulated**. ONTARIO HAS STANDARDS, CANADA HAS STANDARDS, **but First Nations don't**."

But many of the First Nations whose traditional territories encompass the proposed development are grappling with the potential for economic benefits versus the need for environmental protection amid a lack of meaningful consultation.

"We haven't given our free, prior and informed consent to any development in our territory. We have not been properly consulted by Doug Ford or his government. There hasn't been any accommodation for Neskantaga to understand the Ring of Fire development. And what is going to happen to our way of life, what's going to happen to our land?" asks the chief.

In June, the province announced a deal with four First Nations to build new roads, other infrastructure projects and to provide the skills training to kickstart the development of the region.

But Chief Moonias is frustrated that Neskantaga is being by-passed in the process. Ontario has committed to invest $1 billion in the Ring of Fire, while Neskantaga struggles with its long-term water crisis.

"How many First Nations communities have ever benefited from companies extracting resources from their territories?" says Chief Moonias. "Why are we living like this? Why don't the companies and government negotiate with us and give us part of the benefits?"

Derek Moonias collects water at a natural spring to drop off to the homes of Elders.

Dayna Scott, professor at Osgoode Hall Law School and the faculty of environmental and urban change at York University, equates the water crisis with a lack of political will among the Ontario and federal governments.

"We are not in an environment of scarcity," says Scott, who has collaborated on research projects and environmental assessments with Neskantaga related to the Ring of Fire.

"The province is spending millions on subsidies for [electric vehicle] battery-makers for the Ring of Fire and $1 billion on the road to the Ring of Fire [and other infrastructure], all for the benefit of a mining company," says Scott. "Yet they seem unwilling to really work towards improving community conditions on the ground."

DEREK MOONIAS heads out on his weekly trek an hour's drive from the reserve. After navigating a bumpy dirt road, he hikes into the bush to access a fresh underground spring. It's nestled at the end of a forest path cluttered with fallen trees and moss beds that sink deep into the earth. The spring is one of two in the area that are treasured by Neskantaga community members.

"WE ARE NOT IN AN ENVIRONMENT OF **scarcity**."

When he was a child, Derek's grandfather showed him the springs and taught him about their ancestral way of life. Derek vowed to never lose the knowledge of the landscape and to always know where to find fresh water. He bends down to pray in Anishinaabemowin and lowers a plastic container into the bubbling spring. After filling three large plastic bottles, he cups his hand, dips it into the water and takes a sip. He releases a long sigh of comfort.

"That [water] right there, that's sacred. This water I gathered here will go to the Elders. They crave this, and I'm very glad to do this for them."

And soon Derek will be in their shoes. "I'm getting close to the age when I'll be called an Elder, maybe in another 12 to 15 years," he acknowledges back at the cemetery. "I don't know yet how to explain these new things we face. Where did suicide come from, how does it exist in our culture, how do we manage it?"

He then asks the ultimate question: *will we ever be able to drink the water?*

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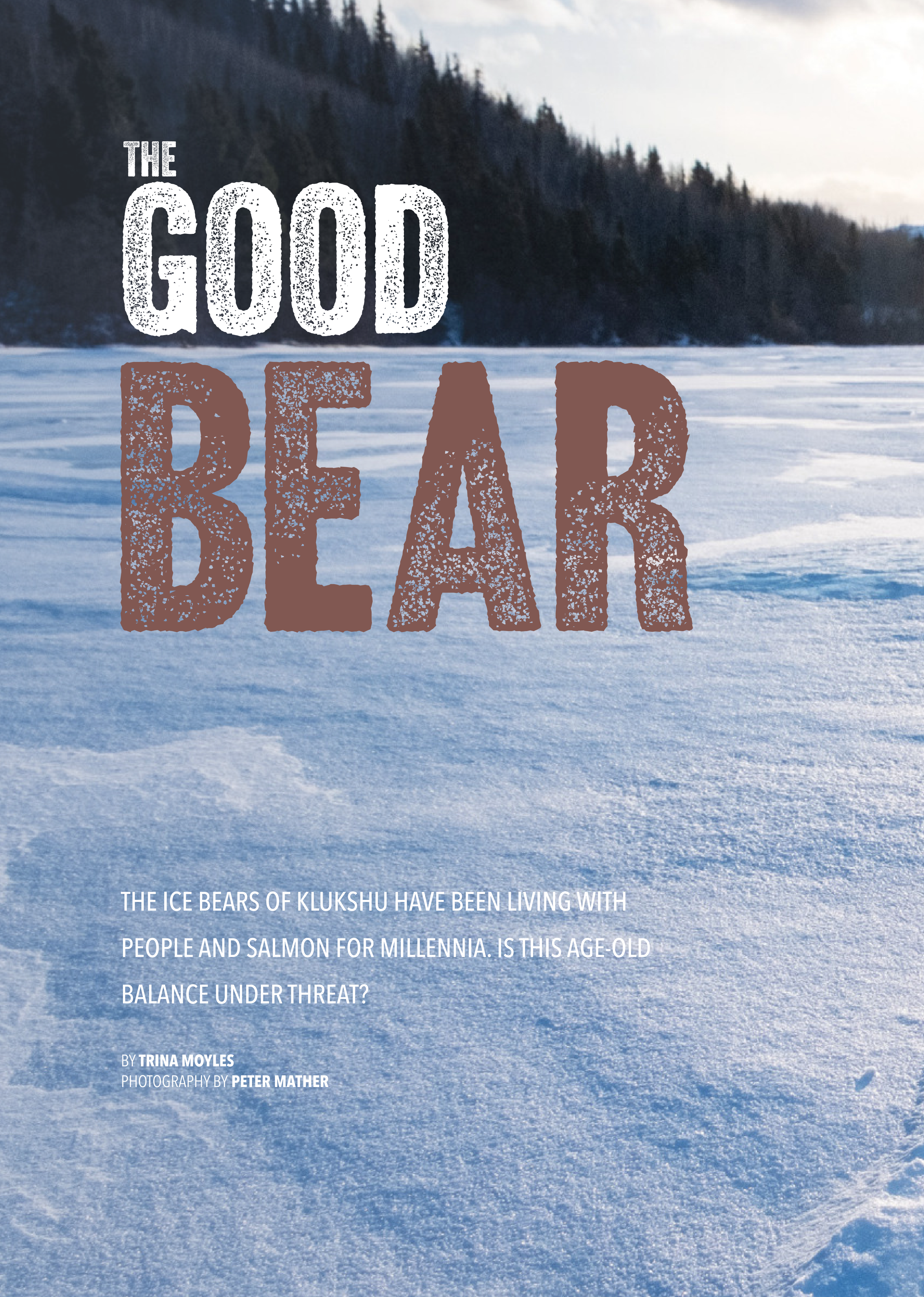


THE GOOD BEAR

THE ICE BEARS OF KLUKSHU HAVE BEEN LIVING WITH PEOPLE AND SALMON FOR MILLENNIA. IS THIS AGE-OLD BALANCE UNDER THREAT?

BY **TRINA MOYLES**
PHOTOGRAPHY BY **PETER MATHER**

ON THE WALL of Chuck Hume's cabin on the bank of the Klukshu River in southwestern Yukon hangs a photograph of a dominant male grizzly bear the locals called the "Mayor." The photo was taken by Whitehorse-based wildlife photographer Peter Mather, who, with special permission from the Champagne and Aishihik First Nations, documents the grizzlies along the Klukshu using remote camera-trap technology.

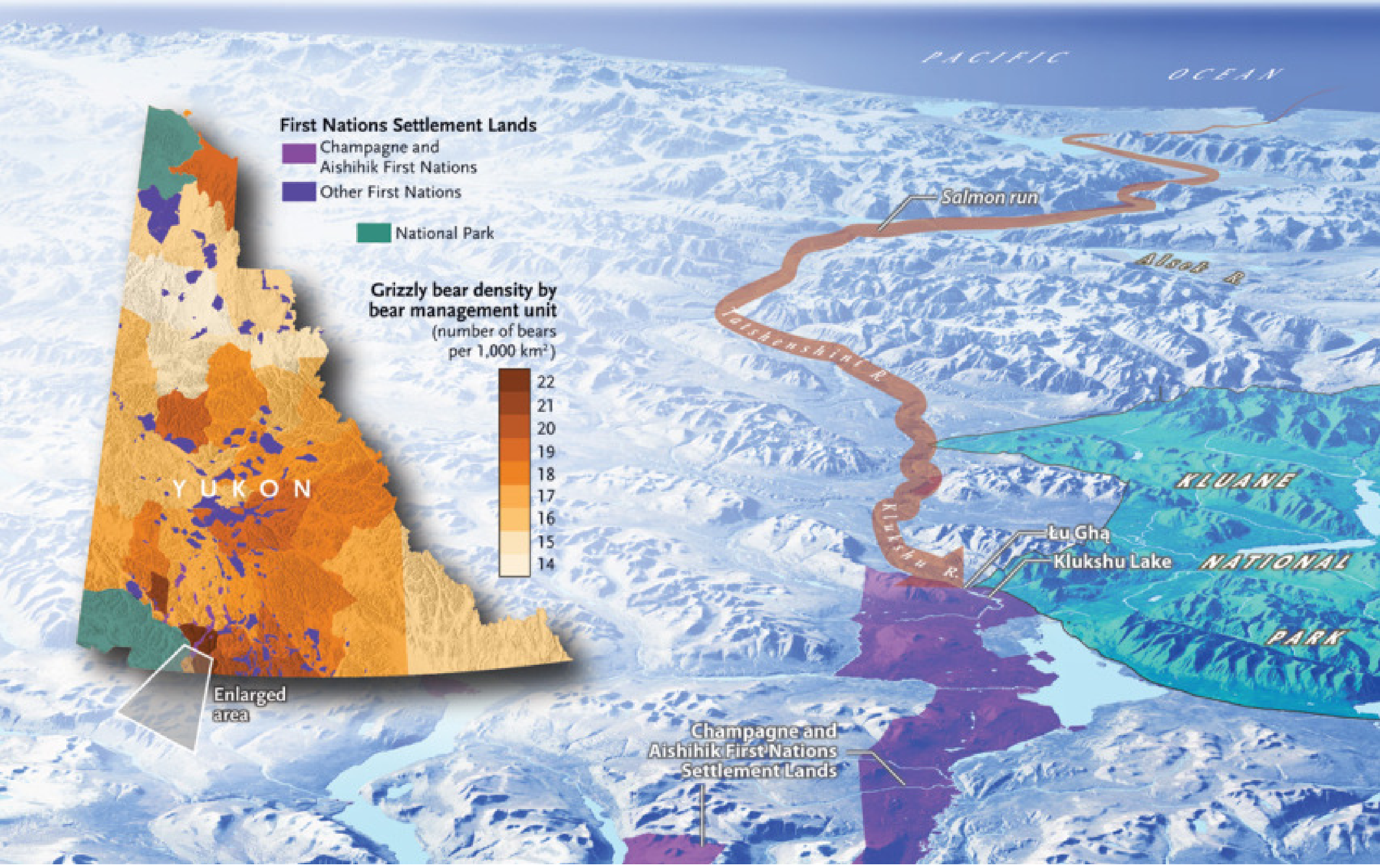
Hume, a Champagne Elder in Klukshu, first encountered the Mayor more than a decade ago, when the bear was about three years old, likely recently weaned from his mother. As Hume watched the bear feasting on soapberries by the road, a truck drove by and honked its horn to warn him, inadvertently spooking the bear towards him. Hume got in his truck and drove towards the village; the young bear followed.

"He was treating me like the mother bear," Hume says with a fond smile.

"He *trained* that bear," says his wife, Barb, as she pours me a cup of tea.

Hume chuckles with a twinkle in his eye. "My son says, 'we don't have to worry about bears. My dad trains them all.'"

Klukshu is in the Dezadeash bear management unit, home to one of the densest grizzly bear populations in Yukon; the territorial government estimates there are 21.4 bears per 1,000 square kilometres. It also borders Kluane National Park and Reserve, which has one of the highest densities of grizzlies in Canada at 40 bears per 1,000 square kilometres. They're drawn here by three species of salmon — king salmon, sockeye, and coho — that migrate 200 kilometres annually from the Pacific Ocean through the Tatshenshini and Alsek river basins to spawn


First Nations Settlement Lands
Champagne and Aishihik First Nations
Other First Nations
National Park
Grizzly bear density by bear management unit
(number of bears per 1,000 km²)
22
21
20
19
18
17
16
15
14
YUKON
Enlarged area
PACIFIC OCEAN
Salmon run
Alsek R.
Tatshenshini R.
Klukshu R.
Łu Ghą
Klukshu Lake
KLUANE NATIONAL PARK
Champagne and Aishihik First Nations Settlement Lands

MAP: CHRIS BRACKLEY/CAN GEO. BEAR DENSITY DATA: REVIEW OF GRIZZLY BEAR MONITORING AND MORTALITY MANAGEMENT IN THE YUKON, GOVERNMENT OF YUKON FISH AND WILDLIFE BRANCH, AUGUST 2022. LANDSAT IMAGERY: NASA, 2020. ELEVATION MODEL: JAPAN AEROSPACE EXPLORATION AGENCY (JAXA), 2024.

in the Klukshu River and the outlet of Klukshu Lake.

Salmon are the reason people are here, too. Klukshu is a name derived from a Tlingit word meaning "silver salmon, end of." The Champagne and Aishihik First Nations call the village Łu Ghą, meaning "a place for fishing" in the Southern Tutchone language. It's a fishing camp they and their ancestors have used seasonally to harvest and dry sockeye salmon. Historically, people camped in tents and caught sockeye in wooden traps and with fishing gaffs from June until late September. Women processed and hung the fish to dry in smokehouses built from spruce logs. The dried salmon sustained their families and dog teams through the long winter.

Today, Klukshu is made up of small seasonal log cabins built along the riverbank. The smokehouses still stand, bleached silver from the sun, though it's rare for salmon to hang from their rafters these days.

It's September, and the golden leaves on the balsam poplar trees flutter in the wind. Standing on the wooden footbridge that spans the narrow river, I count 20, maybe 30 sockeye, rippling ruby red in the river below. While there's historical evidence that the returns of sockeye salmon have fluctuated considerably year to year — with numbers ranging from 30,000 to fewer than 10,000 — Elders say they've declined dramatically over the last century.

According to Teresa Wallace, acting senior aquatic science biologist for the Alsek River drainage with Fisheries and Oceans Canada, sockeye runs have been highly variable over the past 25 years, and it's difficult to pinpoint a reason for their surges and declines. It may be the result of changes in water temperature, spawning habitat and food availability, or a combination of factors the salmon face as they migrate.

They're also subject to commercial fishing, says Wallace, necessitating their monitoring and management in both Canada and the United States. She points to the 1985 Pacific Salmon Treaty, a framework in which both countries work together to try to ensure enough salmon escape to their spawning grounds. Wallace says Fisheries and Oceans Canada has been working closely with the Champagne and Aishihik First Nations "at the table and on the ground" to monitor and manage salmon since 1976.

Grizzlies are active in Klukshu (PREVIOUS and OPPOSITE, TOP) throughout the early winter, fishing for coho and sockeye salmon (OPPOSITE, BOTTOM).

Trina Moyles (@trinariannemoyles) is an award-winning journalist and author. Her new book, Black Bear, *comes out soon. Photographer Peter Mather (@peter.mather.photography) specializes in longterm photo projects on conservation issues around his home in the Yukon.*

The century-spanning sockeye declines in Klukshu have had ecological consequences not only for the Champagne and Aishihik First Nations but for a species with which they coexist: grizzly bear, or shar shäw in the Southern Tutchone language. The community rarely addresses shar shäw by name. Instead, they refer to them with kinship and respect, with individual bears given names like "Big Grandpa" or "Brother" — or, the Mayor.

"THIS AREA has been inhabited for a long time with salmon and bears," says Hume. He grew up camping along the banks of the river and listening to the stories of his parents and grandparents, stories passed down over generations about the delicate balance between people, salmon — and bears. He points to archeological evidence of early human habitation on Champagne and Aishihik First Nations territory found in melting ice patches, including a 9,000-year-old wooden hunting dart. Indeed, Klukshu is one of the oldest examples of human-bear coexistence in North America — and it was the salmon that brought them together.

Families fished for sockeye during the day in Klukshu until the late afternoon, explains Hume. By 4 p.m. they'd "get off the creek" to give the bears a chance to feed on the running salmon. On the banks, the community would process salmon for drying — de-gilling and gutting them, and saving the head, a delicacy, to later boil or bake in the fire — and throw the scraps back into the creek for the bears and other scavengers. There was enough for everybody, including bears.

"He was treated with respect all the time," says Hume, referring to the bears.

Elder Chuck Hume (OPPOSITE) in front of his cabin on the Klukshu River. Hume has lived with bears like "the Mayor" (OPPOSITE, BELOW) his entire life. Wolves (ABOVE) also depend on late season salmon runs; Barb Hume (RIGHT) outside their smokehouse.

But lately, there have been few grizzly bear sightings along the Klukshu River during the sockeye run. As the runs decline, the "bear patterns are changing," says Hume, with the bears coming to the river later in the fall. During my visit, villagers talk not of bears but of the wolves. They can hear a resident wolf pack howling at night. There's been a sighting of the pack's pups. The wolves, Hume says, help to keep the bear population in check; the females teach their young to prey on cubs.

"My dad always said, 'you have to watch that balance between wolves and bears,'" says Hume. "You kill too many wolves, and your bear population goes up." Likewise, too few bears mean too many wolves.

Hume believes the grizzly bears are adapting to the diminishing sockeye returns by feeding on the abundance of moss and soapberries in the mountains in September, then coming to the river in October and November when the coho salmon start to run, pushing the wolves out.

SHARING THE KLUKSHU RIVER WITH BEARS COULD HAVE **POSITIVE BENEFITS** FOR BOTH ENVIRONMENT *AND* HUMANS.

"It's an interesting balance," he says. "The wolves and bears, they counteract one another, but they still know when to leave the other alone."

With warming temperatures and changing salmon patterns, Hume's been seeing Klukshu grizzly bears out later into November, even early December, feeding on coho. Some call them "ice bears" for the way their wet fur becomes encased in ice, dangling from them like chandeliers. There's even a word for "winter grizzly bear" in the Southern Tutchone language: uyekatth'u, or a bear forced out in winter.

Research is showing that the effects of a changing climate — warming temperatures, melting glaciers and shifting food availability — have the potential to amplify conflicts between humans and wildlife. What can we learn from people in Klukshu about how to live with grizzly bears?

"Even before firearms, Champagne and Aishihik First Nations people had the technologies and skills to exclude bears from the river if they had wanted to," says Douglas Clark, a human-bear conflict specialist and professor at the University of Saskatchewan. "They chose coexistence."

Hoar frost (ABOVE) covers the forest in November. Grizzlies fish at night, too, when salmon are more docile (OPPOSITE).

In the early 2000s, Clark worked as a park warden in Kluane National Park, and later, focused his PhD research on grizzly bear-human coexistence in Klukshu, asserting that Indigenous knowledge can provide guidance. He continues to partner with the Champagne and Aishihik First Nations on wildlife projects today.

Clark's research in Klukshu explored the concept of "practices of respect" for living with grizzly bears: rules for living with bears passed down through generational knowledge. But the notion of "respect" is not as ubiquitous as it may seem, he cautions. "Respect is a word that people from multiple cultures use and, as non-Indigenous people, [we tend to think] we're agreeing on what it means — but we're wrong," he says.

Respect for bears through a western lens, for example, could imply *mutual avoidance*, a strategy commonly used by wildlife managers to keep people and bears separate. But in Klukshu, Clark points out, respect doesn't mean distance; instead, it refers to a dynamic relationship with bears.

"Respect is a social relationship between individual bears and individual people."

And the details, says Clark, matter profoundly.

THERE ARE RULES to living with grizzly bears in Klukshu, says Doris Allen, an Elder who has come here every summer for the past 60 years to fish. We meet in her cabin in Klukshu. Outside, a ribbon of smoke rises up out of her smokehouse, only it's not sockeye salmon that's drying: it's a moose, recently harvested by her grandsons.

Originally from the Vuntut Gwitchin First Nation in Old Crow, Allen first came to the summer fishing village to stay with her late husband, Grand Chief Harry Allen, and his family in the early 1960s. At that time, some people were still camping in tents.

"The Elders would talk about the bears, how they'd come and go, and warn you: 'don't be wandering around bushes by yourself,'" says Allen, who admits she broke that rule only once. She can vividly recall a day in June while fishing for king salmon — a species of salmon that weighs four to five times more than a sockeye — near the community of Dalton Post. Allen took a short cut off the trail, bushwhacking towards the river to see the salmon, when she came face to face with a grizzly bear standing on his hind legs. She froze on the spot.

"That guy was a big blonde — taller than I am," she recalls. "He looked at me and I looked at him. I couldn't move. I couldn't even yell."

Her husband and another man came up behind and the bear ran off.

"After that, I don't run to the creek by myself like that," chuckles Allen.

The Elders had other rules, too, about not saying the bear's name or speaking badly about him. They spoke about the importance of keeping the area clean of garbage because

An ice bear searches for salmon (ABOVE). In Klukshu (OPPOSITE), the right side of the river is for people, the left for bears.

"they've got a good nose; they can smell a long way.

"The Elders would always say, don't cook bacon during fall time or you're going to have somebody knocking at your door," laughs Allen. "I got a kick out of that one."

Allen and her husband built their first cabin in Klukshu nearly 50 years ago. She never remembers having a negative encounter with a grizzly bear.

"They just want fish," she says, noting how the bears feed on the salmon's head, neck and tail and leave the rest of the carcass to decay on the shore.

Sharing the Klukshu River with bears — and practising the rules of respect — could have many positive benefits for both environment *and* humans, says Clark. He points to studies in nearby coastal Alaska that have found brown bears play a key role in transferring salmon-derived nitrogen into terrestrial systems (by depositing carcasses and scat), which enriches the growth of trees and plants. While the same research has yet to be conducted in Klukshu, Clark wonders if the nutrient transfer from salmon to grizzlies to land is promoting willow growth and, in turn, improved moose habitat for hunting.

"To this day, no researcher has looked at the *human role* in bear-salmon systems," he says. But this example "allows us a much bigger, bolder way of thinking about coexistence between people and bears," says Clark. "It's more than tolerance; there can be mutual benefit."

PEOPLE IN KLUKSHU respect the wisdom of bears, says Hume. He's sitting across from me at the kitchen table in his cabin, built only metres away from the river — so close that he and Barb can sometimes hear the salmon splashing upstream at night.

"He was a kind of teacher to our people," he says, noting how they'd observe the different plants that the grizzly bear fed on during spring, after months of hibernating and fasting in the den, to stimulate their digestive systems.

"Our people used to have a diet of straight meat, straight salmon — so in the spring, you had to cleanse your system," says Hume.

There were protocols for moving through the bush: the bears sense if you have fear or you're talking about them, which could imply human superiority over bears. If there's a big scat on the trail, "you walk around — you don't step over," says Hume.

Hume talks to the bears and asks them to stay on "their side" of the river. Sometimes he relies on the use of non-lethal deterrents, including rubber bullets, to dissuade the bears from crossing over. Occasionally, he recalls, when the sockeye salmon ran abundantly, bears that edged too close to the fishing traps would be shot. People built wooden stands along the river to target bears deemed too aggressive. But even when bears were killed, specific rules were followed to honour and respect their lives, including opening

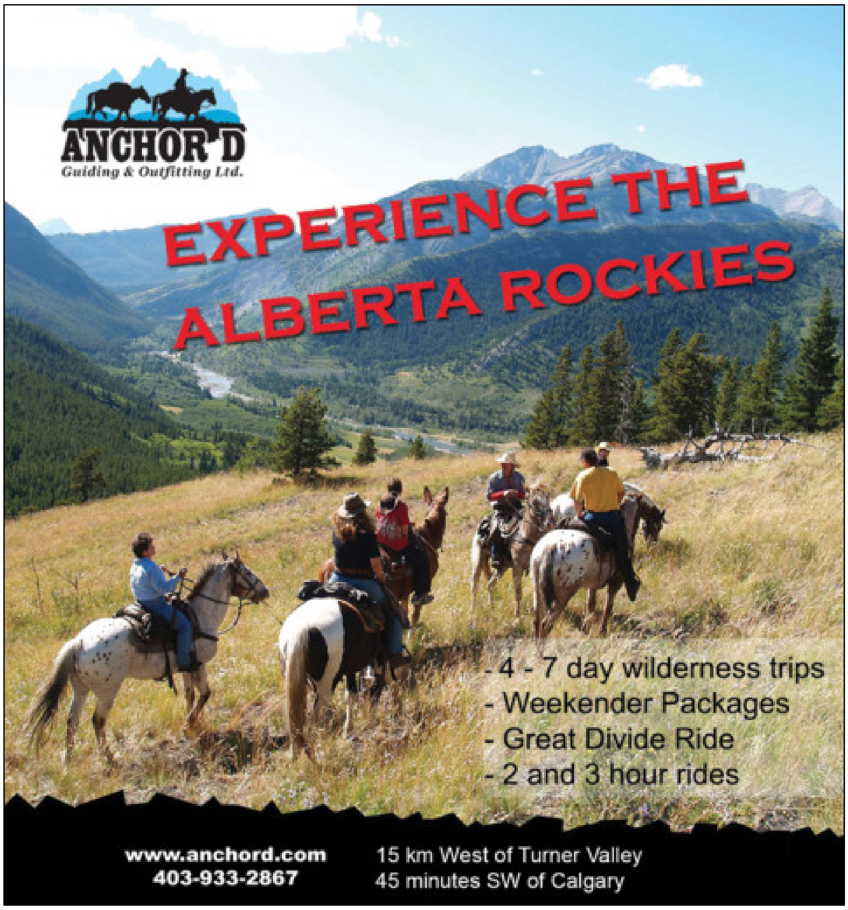
the stomach and pulling the intestines north, or placing the skull in a tree or other high place.

Some of the grizzlies, however — often older, more dominant bears — would learn to coexist along the Klukshu River, fishing along the opposite bank and keeping their distance from people. These are the bears people *wanted* around, says Hume.

“We used them as protection,” he says. “The big grizzly bear wards off the younger ones, so we’re always respectful of the older ones. He kind of looks after the village and looks after the people.”

Clark refers to the concept of the “good bear” in his research, citing a longstanding, sophisticated practice of the Champagne and Aishihik First Nations to observe and take advantage of the natural dominance hierarchy that develops when grizzly bears come together.

“Those big males tend to be very smart and confident,” says Clark. “By tolerating a big male bear staying around the village, and giving it



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THIS PAGE: A scattering of coho salmon eggs is a meal for an American dipper. OPPOSITE: Coho and sockeye salmon at their spawning grounds at Klukshu Lake.

the space and time to fish, those potentially troublemaking younger bears tend to stay away."

The bear known as the Mayor was one of those. Over the years, Hume developed a special bond with him.

"When I left [Klukshu] in the late fall, he'd still be fishing on coho in the water. He'd come and lay on the porch of my old house," says Hume, gesturing to the cabin next door.

Essential to these kinds of relationships, says Clark, is that people practise the rules of living with bears consistently. The bears, in turn, observe predictable and non-threatening human patterns they can respond to.

"The bears figure this out and as long as the people there learn the rules and follow them — which they have done for millennia and still do — it can all work," Clark says.

For nearly a decade, the Mayor fished along the banks of the Klukshu River, keeping younger bears — those more likely to take risks to obtain food — at bay.

Then, on November 15, 2023, wildlife photographer Peter Mather was driving along the highway, checking his remote camera traps along the river, when he noticed a number of ravens circling. On the side of the highway, Mather discovered a bear carcass in the snow. The animal's head, hide and paws were missing, a sign of a trophy hunt (legal in the Yukon, provided the hunter has a valid licence and permit).

Days later, Mather received a screenshot from an acquaintance. The hunter had posted a photograph of the dead bear on his Facebook page. Mather showed the image to Hume,

A grizzly bear nabs a chum salmon on the nearby Kluane River.

who immediately identified the bear as the Mayor. The bear hadn't been seen in recent months. Hume suspects a long-legged black grizzly bear may have pushed him out of Klukshu.

"His time was coming," Hume says with somber resignation in his voice.

Community members in Klukshu have been grieving the loss of the enigmatic bear.

"It's really sad," agrees Allen. "He was a good bear. We'd see him every year. Somebody shot him just for parts. They left the carcass. It was bad."

Following the bear's death, Yukon Conservation Officer Services charged the hunter with two violations of the Wildlife Act, including hunting a grizzly in an area where he was not permitted to and careless use of a firearm. But months later, in court, all charges were dropped because a conservation officer had originally told the hunter that the kill was legal.

Hume is advocating for a three-kilometre corridor around Klukshu to be off-limits for hunting.

AT THE END OF SEPTEMBER, 10,343 sockeye salmon were counted through the Klukshu River, a far cry from the preseason forecast of 31,400 and below the 10-year average of 13,700 salmon, says Wallace.

> RESPECT IS A SOCIAL RELATIONSHIP BETWEEN INDIVIDUAL **BEARS** AND INDIVIDUAL **PEOPLE.**

Meanwhile, in Klukshu, the memory of abundant sockeye runs — of the rivers overflowing with salmon — is still alive with Elders like Hume and Allen. Today, their former spawning areas at the outlet of Klukshu Lake have become crowded with weeds, says Hume. "There's no room for them to spawn."

There's uncertainty around how Klukshu will adapt to future ecological changes and what the loss of the Mayor will ultimately mean for the community. What remains the same, however, is people's respect for the bears. Allen doesn't bother to board up her windows or otherwise bear-proof her cabin. The squirrels, she says, are more bothersome than the bears. She heeds the advice of Elders who told her that, come mid-October, everyone should leave Klukshu so the bears can feed on the spawning coho. When the snow falls in November, the grizzlies wander down to the banks of the Klukshu River, now void of people.

"It's their territory, too," says Allen.

Watch *Kings of the North*, Peter Mather's short film about the Klukshu ice bears, at cangeo.ca/icebears

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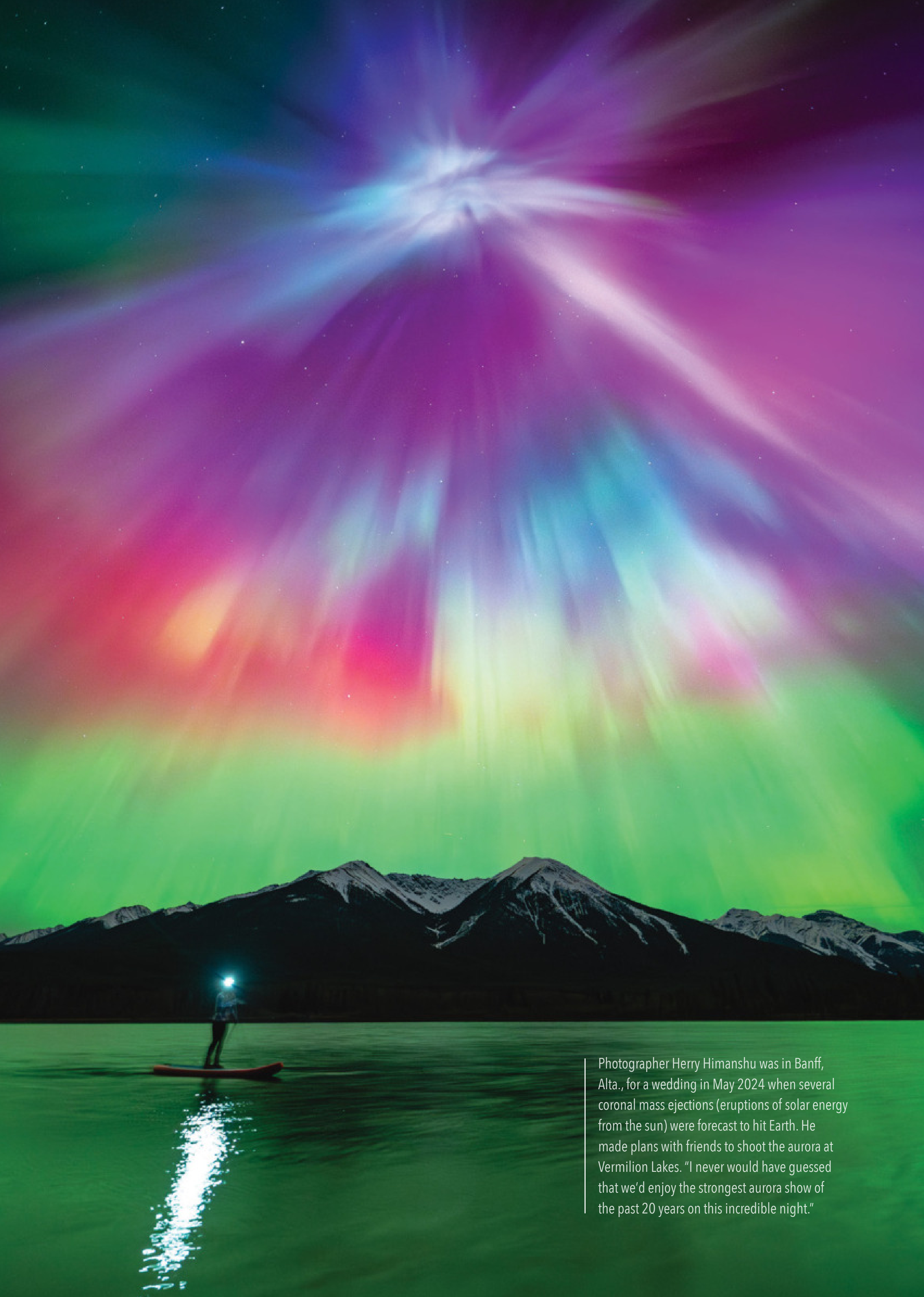


Photographer Herry Himanshu was in Banff, Alta., for a wedding in May 2024 when several coronal mass ejections (eruptions of solar energy from the sun) were forecast to hit Earth. He made plans with friends to shoot the aurora at Vermilion Lakes. "I never would have guessed that we'd enjoy the strongest aurora show of the past 20 years on this incredible night."

FLYING COLOURS

THE SOLAR MAXIMUM IN 2024 BROUGHT PEOPLE FROM EVERY CORNER OF CANADA TOGETHER UNDER THE DANCING AURORA BOREALIS – AND THE EPIC SKY SHOW IS SET TO CONTINUE FOR MANY MONTHS

PHOTOGRAPHY BY **THE *CAN GEO* COMMUNITY**
WITH WORDS BY **ELIZABETH HOWELL**

AS PHOTOGRAPHER MARK JINKS set up his equipment in a farmer's field near Edmonton ahead of a solar storm in October, he could already see a faint glow of the northern lights against the blueish hue of twilight.

"My only concern was a bank of cloud cover to the west, which I managed to keep ahead of by continuing to move east," he says. It was worth the drive from the light-polluted city centre to look for the lights. "I can only remember a select few [events] being this memorable."

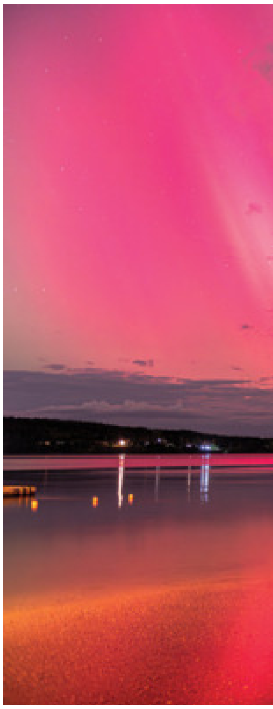
Indeed, 2024 was a spectacular year for the northern lights, as the sun approached a period of peak activity called a solar maximum. During this phase, which happens every 11 years, the sun shoots energetic particles into space like a celestial garden hose. These particles make their way to Earth and sprinkle into the atmosphere along magnetic pole lines, striking molecules of air and glowing vibrantly as they go. In October, when the sun reached the pinnacle of its activity, auroras festooned night skies around the world. In Canada, the aurora borealis was visible from Tuktoyaktuk, Northwest Territories, to the most southern latitude at Ontario's Point Pelee National Park, drawing people from all walks of life outside to view the sky's majesty together.

If you missed the show, fear not: stunning aurora borealis displays will continue through most of 2025. Like parents of young children, aurora borealis seekers bond over their lack of shut-eye: "When you see your friends sharing their photos of the aurora, it's hard not to want to chase them yourself," says Jenna Hinds, executive director of the Royal Astronomical Society of Canada. "The auroras are brief, unpredictable and uncommon in many areas, which makes them the perfect astronomical phenomenon to unite stargazers."

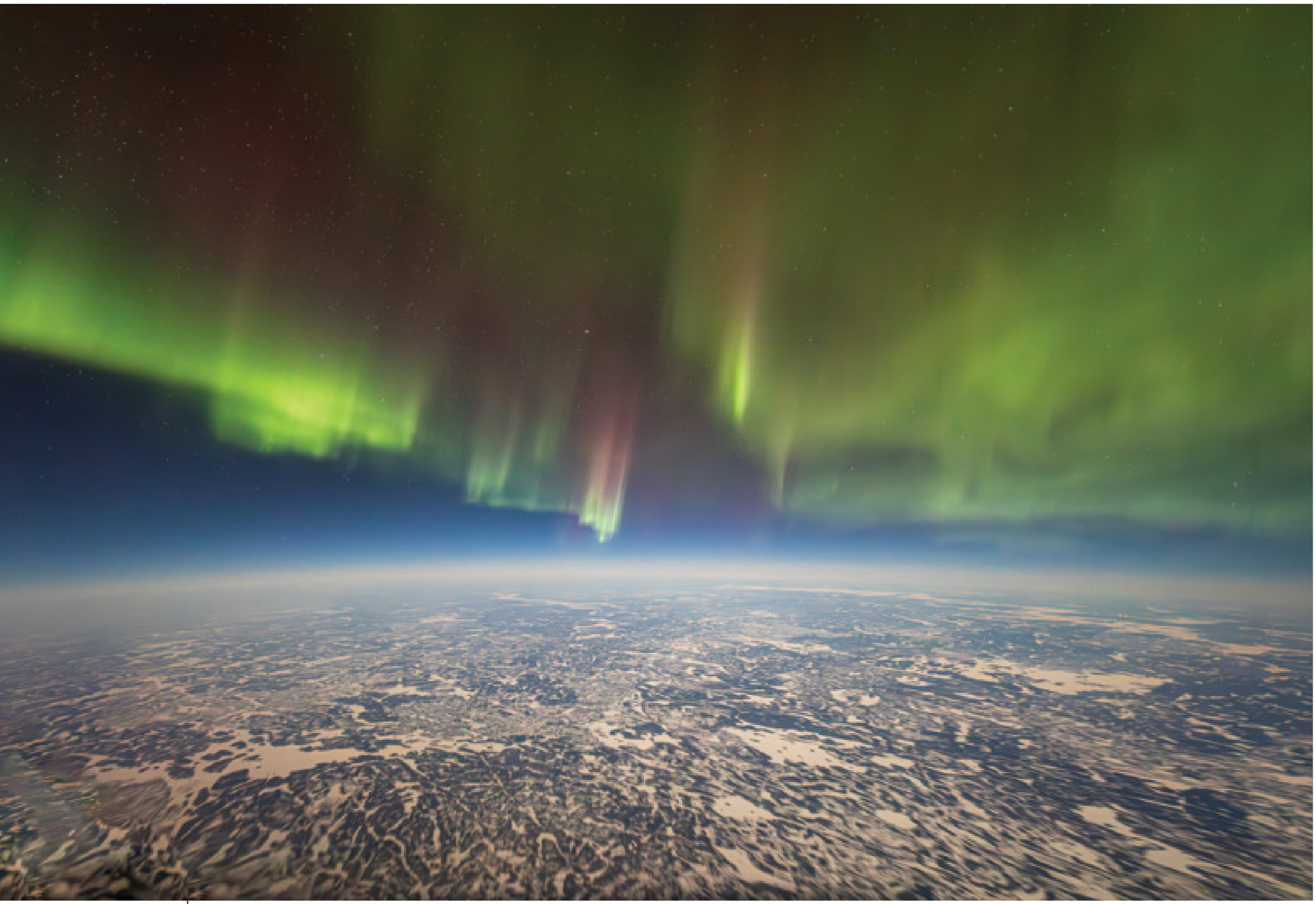
Curtis Matwishyn spent two nights at Waskesiu Lake, Prince Albert National Park, Sask., in October to photograph northern lights and snapped this image of himself, his wife and some close friends around a campfire watching the aurora shimmer.

Mark Jinks ventured with friends to an old, abandoned homestead south of Edmonton in May. "The aurora danced above and around us … creating one of my most memorable evenings under the northern lights."

Jean-Christophe Lemay was photographing the northern lights over the St. Lawrence River in Rimouski, Que., in May. All of a sudden, the whole beach turned pink. "I looked to the west and I saw some of the brightest auroras I've ever seen in my life. The pink hues were astonishing."



Clockwise from TOP LEFT: Lei Yang captured this image of the aurora over the downtown Toronto skyline in October. "What once seemed impossible became a reality: capturing the northern lights dancing above the CN Tower."; On October 10, 2021, photographer Justin Anderson and his partner met for the first time, connecting over a shared love for the aurora. Three years later, Anderson popped the question under a dazzling display near Newdale, Man. "I spent the morning preparing – charging batteries, setting up gear, " he says. "The fact that it was the exact date we met three years ago felt like fate… She was completely surprised but immediately said yes!"; Kevin Xu captured green bands of the aurora borealis over the treeline along the Inuvik-Tuktoyaktuk Highway, N.W.T., in March; for Ray Mackey, capturing the aurora at Greens Harbour, N.L., in October was a rare treat. "My goal for the evening was to not just capture the wonderful sky show but to show a little N.L. culture in the scene along with the magic."



While flying a Dreamliner on a transatlantic flight from Calgary to Paris in March, airline pilot and photographer Matt Melnyk captured the aurora dancing outside. "This was the view from 37,000 feet near Hudson Bay."

During the solar storm that glowed over much of Canada on September 12, 2024, photographer Jenny Wong scurried down a steep staircase onto her friend's dock on Bear Lake, just outside of Edson, Alta. "The first compositions were actually just the dock with the slide. I thought, 'How sad, a playful scene with no one playing.' So I set the interval timer on my camera and I started to play."

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GEOGRAPHY'S BIG NIGHT!
THE 95th GEOGRAPHICA DINNER

It was a night that provoked both reflection and inspiration as hundreds of Fellows and friends of the Royal Canadian Geographical Society gathered at the Canadian Museum of History in Gatineau, Que. on Nov. 6 for the 95th annual Geographica Dinner. Here are the highlights.

We commenced the evening with a Grand Entry

The dinner kicked off with a Grand Entry brought in by Greg Dreaver and announced by Donnie Spiedel. Led by the Society's Honorary President Chief Perry Bellegarde and guest of honour National Chief Cindy Woodhouse Nepinak, accompanied by Fellow Valerie Bellegarde, the procession leaders were flanked by RCMP Corp. Jennifer Demers and Sgt. Eric Rajah carrying the RCGS and Canadian flags respectively.

Sara Seager blew our minds

Renowned astronomer and MIT professor Sara Seager, best known as an expert in exoplanets, gave us a sneak peek at her latest project: in 2025, the Morning Star Missions will search for signs of life in the clouds of Venus.

95th Annual Geographica DINNER

Jameel Janjua took us to infinity, and beyond

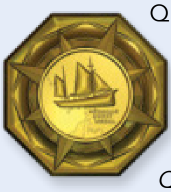
Canadian test pilot Jameel Janjua took to the stage to reflect on the life lessons he's learned in a career that's seen him serve as a fighter pilot with the RCAF and, as of this June, become only the second Canadian to pilot a spaceflight. Janjua flew Virgin Galactic's VSS *Unity* on the Galactic 07 mission and described the sight of our planet from beyond the atmosphere as transformational. Janjua was awarded the Society's Gold Medal.

SOCIETY BRIEFS

EIGHEN
QUEST
ETON'S LAST SH

THE DISCOVERY OF *QUEST* continues to resonate around the world. Expedition leader John Geiger spoke before a full house at Dulwich College, London, for the James Caird Society's annual dinner on Nov. 1. Sir Ernest Shackleton had attended the college.

FOR ONLY THE SECOND time in its history, the Society has struck a special medal. The Quest Medal commemorates the finding of the wreck of *Quest* and was awarded in November to Shackleton Quest Expedition team members and those who supported the project.



Geographica

THE FUTURE OF GEOGRAPHY is in good hands. This past summer, Canadian Geographic Challenge alumni Julian Bal, Shannon Tang, Noah Pilnitz and Angad Khattra represented Canada on the world stage at the 20th International Geography Olympiad in Dublin, Ireland. The team ultimately brought home one gold and two bronze medals.

The Shackleton Quest Expedition team took us to the depths of the ocean

The highlight of 2024 was undoubtedly the finding of the wreck of *Quest*, the last ship of Antarctic explorer Sir Ernest Shackleton, in the Labrador Sea this past June. With several members of the Shackleton Quest Expedition team looking on from their tables, expedition leader John Geiger, search director David Mearns, and research director Antoine Normandin took guests through the thrilling story of the expedition, which saw them successfully find the lost ship against numerous odds. Mearns was awarded the Bernier Medal for his vital contributions to the search.

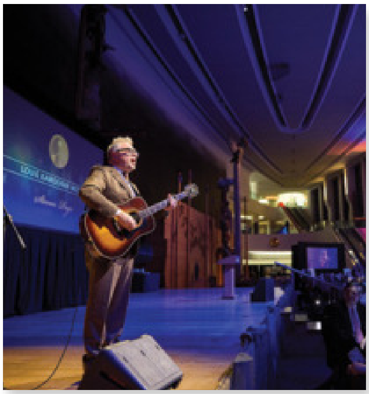
Valérie Courtois called for more Indigenous-led conservation

Valérie Courtois is executive director of the Indigenous Leadership Initiative, an organization that supports Indigenous Nations in honouring their responsibility to care for lands and waters. She reiterated the need for more Indigenous-led conservation areas in Canada. “As a country, we’re about halfway to meeting our international targets,” she said. “We’re about an area the size of Manitoba away.”

Zita Cobb inspired us to harness the power of place

Zita Cobb, proud resident of Fogo Island, N.L. and Innkeeper of the iconic Fogo Island Inn, gave a stirring speech on harnessing the power of place to transform communities and their economies. She shared the fundamental questions of asset-based community development and called on Canada and its many communities to think local and build financial, health and education systems that truly serve people. Cobb (right) was awarded the Burpee Medal.

Steven Page brought the house down

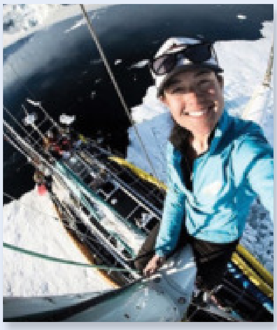


Not much can come between Steven Page — singer, songwriter, multi-instrumentalist and founding member of the Barenaked Ladies — and putting on a great show. When a technical blip meant the Canadian rocker’s amplifier wasn’t working, Page gave a virtuoso unplugged performance. The legendary musician was honoured by the RCGS for his brilliant gift of song, including many that celebrate a sense of place. ❋

SOCIETY BRIEFS

RCGS ‘BUILDS THIS NATION,’ said Spanish Amb. Alfredo Martínez Serrano as CEO John Geiger was invested as Commander of the Order of Civil Merit by King Felipe VI of Spain. Martínez noted Geiger’s role in turning RCGS into “an extraordinary instrument of public diplomacy for this country.”

* * *



THE SOCIETY IS PROUD TO ANNOUNCE the Nat Gillis Adventure Photography and Expedition Grant. The grant will support emerging or established adventure photographers with an expedition in mind. RCGS Fellow David Gray and his family have pledged $50,000 to establish the grant in memory of the great young talent, taken from us too soon.

PREVIOUS PAGE, CLOCKWISE FROM TOP: MELODY MALONEY/CAN GEO; ROGER SLADE; BEN POWLESS/CAN GEO.
THIS PAGE, CLOCKWISE FROM TOP RIGHT: ROSEMARY THOMPSON; NAT GILLIS; MELODY MALONEY/CAN GEO; BEN POWLESS/CAN GEO

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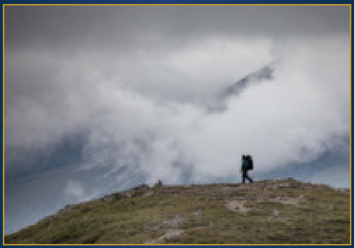

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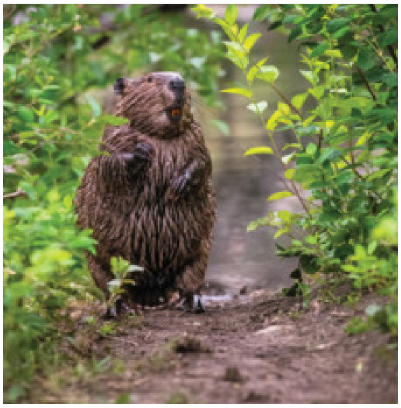
COMING UP

BEAR BRIGADE

Deep in the woods, four yearling black bear cubs sniff the air, exit their crate and disappear into the wild. The Northern Lights Wildlife Society in Smithers, B.C., has rescued and rehabilitated bears for more than three decades. But with wildfires and droughts increasing, staff are grappling with a question: will the bears' natural habitat remain a safe place to be released? Writer Roberta Staley investigates in a future issue.

EAGER BEAVERS

They're ecosystem engineers. They're the largest rodent in North America. Their pelts were an engine of global trade. As far as Canadian animals go, you can't get more iconic — or more Canadian — than the humble beaver. To commemorate half a century being Canada's official symbol, *Canadian Geographic* pays homage to the beaver in the March/April issue.



MACRO MAGIC

Vital to landscapes and ecosystems across Canada, insects are often the unsung heroes of the wildlife world. Delve into the brilliant and bizarre realm of insects through Edmonton-based photographer Dara Ojo. His bright and beautifully intricate macro photography captures views of Canadian insects that are rarely seen. See the photos and learn more in an upcoming photo essay.

RETRACING FOOTSTEPS

In 1908, pioneering naturalist, mountain explorer, writer and photographer Mary Schäffer Warren embarked on an expedition through the wildflowers of the Maligne River valley in what is now Jasper National Park. More than a century later, writer Meghan Ward and the late photographer Natalie Gillis followed in Schäffer Warren's footsteps. Watch for their moving tale in the next issue.

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CLOCKWISE FROM TOP LEFT: TALLULAH PHOTO; JEFF WIZNIAK/CAN GEO PHOTO CLUB; NATALIE GILLIS; DARA OJO

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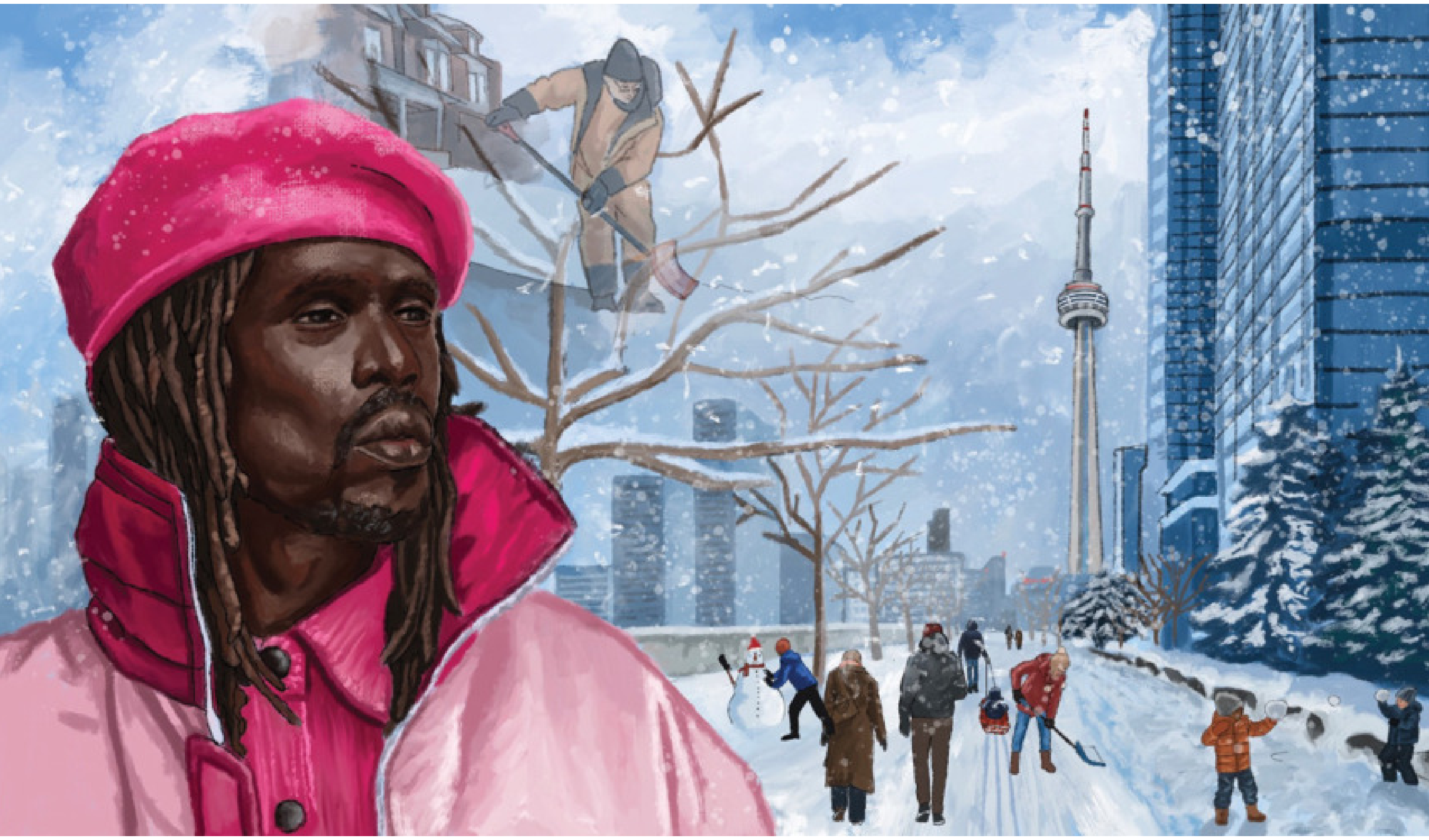

Emmanuel Jal

The South Sudanese-Canadian artist, actor, DJ and political activist says it's the people that make Toronto so special

Home is where you are loved. Anywhere you are loved becomes meaningful. When I immigrated to Canada in 2012, it wasn't Toronto's beautiful views or rich culture that made this city feel so special. Instead, it was the people who welcomed me into their city with open arms and have made me feel like I'm at home ever since.

Toronto is a place where I walk out of my house and I don't see my colour. After a big snowstorm one winter, I came across my white elderly neighbours shovelling off snow from my house and walkway, helping to dig me out. One of them is 87 years old, and he still did it with a smile on his face. They have always looked after me since the day I moved in.

One of the people that invited me into Canada helped with administrative tasks and was my main point of contact — though she refused to be paid even after being offered money countless times. She says she got joy out of just seeing me smile. The people here are amazing, and if they don't know, they need to know.

I feel safe in Canada, particularly in Toronto. I grew up surrounded by violence, death and trauma, and now I am running my own record label and have my own wellness business. I grew up in a warzone in South Sudan and became a child soldier, wielding an AK-47 at seven years old. But here in Canada, I don't feel like I have to purchase a gun to feel safe. The people who live here make me feel at peace. I came to Canada with nothing, and now I have so much. ❂

—as told to Samantha Pope

Toronto is on the traditional territory of the Mississaugas of the Credit, Anishinaabek, Haudenosaunee and Huron-Wendat Peoples.

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WHAT DO THEY SEEK?

Explorers, adventurers, scientists. Men and women who always broadened the horizons, for all humankind to share. Rolex was at their side when they reached the deepest point in the oceans, the highest summits of the Earth, the deepest jungles and both poles. But now that we know, more than ever, that our world has its limits, why do they continue to venture out there, again and again? Certainly not for kudos, accolades, or an ephemeral record. What they truly seek is to understand more intimately how complex and delicate our planet is, to document its change and how together, we can affect it for the better. So as long as they need it, we will be at their side. Because today, the real discovery is not so much about finding new lands. It's about looking with new eyes at the marvels of our planet, rekindling our sense of wonder, and acting to preserve our pale blue dot in the universe… **Doing our very best for a Perpetual Planet.**

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